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EDITORIAL ANNOUNCEMENTS.

THE BRITISH AND EASTERN CONTINENTS edition of the Railroad Gazette is published each Friday at Queen Anne's Chambers, Westminster, London. It consists of most of the reading pages of the Railroad Gazette, together with additional British and foreign matter, and is issued under the name Railway Gazette.

CONTRIBUTIONS.—Subscribers and others will materially assist in making our news accurate and complete if they will send early information of events which take place under their observation. Discussions of subjects pertaining to all departments of railroad business by men practically acquainted with them are especially desired.

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VOL. XLII., No. 8. FRIDAY, FEBRUARY 22, 1907.

The past week has seen two important new note issues. First the New York, New Haven & Hartford sold an issue of $29,000,000 15-year 4 per cent. notes in the markets of Europe, and on Tuesday the Pennsylvania Railroad came out with the announcement that it had sold an issue of $60,000,000 3-year 5 per cent. notes to Kuhn, Loeb & Co. The New Haven loan marks the second important case of successful financing by an American railroad abroad, the first being, of course, the placing of a loan of nearly $50,000,000 by the Pennsylvania Company last year. It is also of interest as showing the present necessities of the New Haven system, which, during four weeks of December and January, also placed $26,000,000 short-time notes in this country. The Pennsylvania borrowing is supposed to represent all the new capital which will be raised by that road during the year. This, in spite of the fact that it is not intended to use any of the $200,000,000 stock or bonds which the stockholders have, as a precaution for the future, been asked to authorize at the annual meeting on March 12. It is announced that the proceeds of the $60,000,000 notes will meet all the requirements of the company for construction, including the New York terminal and other expenditures, and also $50,000,000 Pennsylvania Company 18-month notes maturing November 1. It is probable, however that the proceeds of the new issue will be used for immediate construction requirements, leaving the refunding of the November notes to be taken care of by the proceeds from the sale of the Baltimore & Ohio, Norfolk & Western and Chesapeake & Ohio stock holdings of the Pennsylvania last fall. These funds, it appears, instead of being paid in cash at that time, are being received in time payments, which by November will be sufficient to take care of the then maturing Pennsylvania Company notes. Some such arrangement is certainly more than probable, for after providing for the $50,000,000 November notes there would be only $10,000,000 new funds available from the new issue, and this amount, even with a cutting down of new expenditures, would never be sufficient to meet the company's requirements for the year.

The box car of the Union Pacific, which is described elsewhere in this issue, is the extreme development of the steel car. It seems strange that the experiment of building a box car with a steel body has not been tried before, for it is only a short step from the high side steel gondola to the box car. Perhaps the reason why the experiment has not been tried, is the important fact that it has not seemed worth while to carry the steel construction above the underframe. It is claimed that the box car described weighs 37,800 lbs., or about 12 per cent. less than the standard box car with steel underframe used on the Harriman lines. The two cars have substantially the same dimensions, the difference in cubic capacity being only 50 cubic feet. This saving of weight is accomplished largely by using only one center sill and designing the side frames as efficient plate girders of considerable depth. The body framing of a wooden box car has always been more or less of a failure as a truss to carry that part of the load between bolsters. The combination of green timber and imperfect fitting usually results in a side frame which carries little or none of the load after a few months of service, but in the steel box car, the side frames having all the members rigidly attached to each other, do support a great part of the load which would otherwise be carried by the longitudinal sills. The saving of 12 per cent. in weight is an important factor but it would seem to have been carried too far in some respects. The use of side and end sheets of No. 11 B. W. G. (less than ⅛ in. thick) may prove to be doubtful economy. Such plates have perhaps a little more strength than the wooden siding commonly used, but certainly not sufficient strength to resist puncture and tearing to say nothing of minor bending in any sort of a collision or derailment. It will cost more to put on a new plate than it would to put on a few siding boards. Steel gondola and hopper cars seldom have side sheets less than $^3/_{16}$ in. thick, and more commonly ¼ in. to $^5/_{16}$ in. Such plates can withstand a good many hard knocks without damage, and it would seem to be better designing to have provided the ends of the car at least with heavy plates, just as the vulnerable parts of a battleship are protected with heavy armor.

The ideal relations between a railroad and its patrons are admirably summed up in the address of President Finley, of the Southern, to representatives of the traffic department of that road at a recent meeting held to make clear the policy of the management in this regard. This address is summarized in another

column. There is no place where, at the moment, the importance of a favorable public opinion to successful railroad operation is being more clearly brought home to railroad officers than in the South, where severe attacks against railroads are being made in almost all of the legislatures. It is the freight and passenger agents, as Mr. Finley says, not the general officers of a road, who come in contact with the public. They have the opportunity either to satisfy the public by fair, frank treatment or to give start to a dissatisfaction which later develops into bitter prejudice by actions which seem arbitrary and tyrannical because their reason is not understood. Whether a company shall be popular or unpopular depends in large measure on the treatment which the public receives at the hands of its representatives. People as a rule are fair-minded, and when fully informed can be relied on to deal justly with railroads. The prejudices, as in all departments of life, generally come from misunderstandings. If the two parties to the controversy could discuss it quietly and courteously, each would understand the position of the other, and most of the hostility of the public to railroads would be removed; therefore even the man who makes impossible or unreasonable demands should not be dismissed with a curt refusal, for he may not know that what he asks is either impossible or unreasonable. If he gets nothing more than a sharp answer he realizes only his helplessness as against the railroad, and comes to look upon the company as an enemy to his prosperity instead of, as it really is, a partner in his success or failure. These are no new truths, but the disregard of them is, probably more than all other considerations put together, responsible for the popular hostility to railroads which exists all over the country to-day. It is too late now to prevent this feeling; it is here, but its hurtful effects on railroads may be lessened and the hostility itself eventually removed by the sort of treatment of the public which Mr. Finley urges on his traffic men. His instructions might well be taken to heart by all railroad men, particularly in the operating and traffic departments, who come in any way in contact with the general public.

On Saturday evening, Feb. 16, the New York Central & Hudson River train No. 25 X, a White Plains local express, scheduled to leave the Grand Central Station, New York, at 6.12, was derailed near Williamsbridge, 10 miles from the Grand Central. The train consisted of two electric locomotives with one smoking car, one combination car and three coaches. The combination car and three coaches were thrown on their sides and dragged in that position something like a car length. Eighteen passengers were killed at the time and three died up to the following Monday night at the hospital, making a total of 21 so far killed. Four others are in the hospital in a dangerous condition, and 140 others were injured. The reason given for hauling this train with two electric motors instead of one is that the contact shoes on the right-hand side of one motor and the contact shoes on the left-hand side of the other motor had been removed, so that to insure continuous contact the two motors were used. The motors are 37 ft. long, measured over the buffers; they have a leading radial truck, eight drivers coupled, and a trailing radial truck. The rigid wheel base is 13 ft. long; the total wheel base is 27 ft.; the weight is about 190,000 lbs. The cause of the derailment is not yet definitely known, but it seems to be beyond question that the trouble began with the trailing radial truck of the leading locomotive. When the train stopped, the leading truck of this locomotive and the coupled wheels were in their place on rails, uninjured, while the trailing truck was broken and standing astride the right-hand rail. At the point where trouble began the curvature was 3 deg. and the elevation of the outer rail was 4½ in. All the evidence so far obtained indicates that the speed was about 50 miles an hour, and so far no evidence has been developed to controvert this. The general dimensions and weight of the high-speed steam locomotives used for many years in similar service on the New York Central are as follows: Over all, length, 36½ ft.; weight, 200,000 lbs. The center of gravity of the electric locomotives is lower than that of the steam locomotives. The derailment was due to a violent spreading of the track under such stress that the spikes were sheared smoothly on a level with the surface of the tie-plates. The track was of the strongest type of construction, with 100-lb. rail, tie-plates, 16 to 18 ties to each 30 ft., bedded in rock ballast. The fact that the spikes were sheared is, so far as it goes, proof that the track was strong, and that the elevation of the outer rail was sufficient to resist a turning movement. The summary up to the date of this writing is simply the location of the trouble at the trailing truck of the leading locomotive and the development from that point of such severe stresses as to spread the rails and leave the following cars to their fate.

It appeared, last June, in reviewing the attendance and exhibits at the conventions of the Master Car Builders' and American Railway Master Mechanics' Associations, that Atlantic City lacked being an ideal meeting place for two reasons—difficulty of concentration outside the meeting hall for private discussions and lack of proper shelter for exhibits. Propositions made to the joint committee for the 1907 conventions made it desirable to return this year to Atlantic City; but the arrangements have been so modified as to meet the objections, at least in part. A large hotel has been designated as headquarters and the evening functions will be held in or near that place. The exhibits will again be placed on the Steel Pier but will be better protected from the elements. The plan for their protection, however, has met with some objection from supplymen, largely because of a misunderstanding of the arrangements. Prior to this year a uniform assessment entitled exhibitors to as much space as they required. Many exhibitors found it necessary to go to the place of meeting from a week to a month before the opening day in order to contract for and superintend the building of their booths. At best, the prices paid for the work were not reasonable; but those who left the matter until the eleventh hour were literally robbed. As every exhibitor had his own idea as to how his space should be enclosed and decorated, the result, æsthetically, was what might be expected. This year the same assessment will be levied and no exhibitor will be restricted to the space he may occupy under that assessment; but a charge of 50 cents a square foot for space occupied will be made to cover the cost of building suitable booths designed in pursuance of a general decorative plan. Special provision has been made for exhibits which cannot well accommodate themselves to the set scheme. The plans, made by the architect, Mr. Bradford L. Gilbert, will give to the exhibits an effect of stability, and the displays outside of the buildings on the Pier will be well protected from rain and fog. The booths will be finished ready for installation of exhibits at least ten days before the first convention opens. The exhibitor will be relieved of much time and care and of all liability to overcharge. The effect will be pleasing to the eye. For these reasons the idea is good; nevertheless, some exhibitors who own substantial structures used at previous conventions will be making an additional contribution for Art's sake.

Car shortage, its causes and its remedies was recently discussed before the Iowa Railway Club. The two papers on this subject read at the meeting are published in this week's issue of the *Railroad Gazette*. One was written by a conductor on the Chicago Great Western, a man who it is fair to assume knows actual operating conditions on at least this one of the Iowa roads from intimate personal experience. He comes out flatly with the novel opinion that instead of there being a car shortage, the through lines have too many cars; the shortage is not in cars, but in terminal facilities and motive power. As showing the first of these lacks he calls attention to the fact that the tonnage handled in the city of Chicago has increased 85 per cent. in the past 10 years, while facilities for handling this business have increased less than 30 per cent. His views on the second point—a shortage of power—is specially interesting as representing the frank opinion which it is usually so hard to have placed on record of a man directly employed in the train service. He believes that the desire to carry heavy trainloads is one of the causes of car shortage. Freight trains are overloaded, giving them a tonnage that they can just manage to get over the road, so that it often takes these heavy trains a week or ten days to get over a 500-mile run. This last point suggests a real reform which, we believe, could be made on certain roads during periods of traffic congestion. At such times of heavy traffic, instead of sending out the heaviest possible trains, it would seem to be the most economical system to lighten the loads and increase the speed so as to make a faster average movement over the road.* An illustration of the success of this system was furnished by the writer of this paper from his personal experience. His paper covered what may be called the operating causes of car shortage and traffic congestion; the other speaker, the Manager of the Illinois & Iowa Car Service Association, dealt more particularly with the traffic causes. It is evident from his remarks that he has had some bitter experiences with trying to enforce demurrage rules, for instance, in the case of shippers or consignees with a pull, also that in his position at the

*See contributions on this subject.

head of a car service association he realizes the serious effects of privileges to railroad patrons on the supply and movement of cars. He sums up briefly the ways in which the shipper, the carrier, the middleman and the receiver are at fault. The conclusion to be drawn from this summary is that although there are criticisms which can be made of the railroad's handling of traffic, by far the most important part of the blame rests on the railroad's patrons who profit by the various privileges which, in times of competitive stress, have been granted to them. His remedy is, in a word, to have railroads act solely as transportation companies. This by doing away with or charging high for reconsignment and other similar privileges and a general agreement by all the railroads on a demurrage rate high enough to prevent delays to cars. He also points out that while it is to the general public's interest to load and unload all cars promptly, it is generally not to the interests of the particular shipper or consignee to do the same. But it is to the interest of all the railroads, both collectively and individually, to have prompt handling of cars. He, therefore, advocates a general agreement among the roads for doing away with these special privileges to patrons which make the railroad a warehousing rather than a transportation company. In this analysis of the traffic causes of car shortage and congestion we believe that a very important opportunity for reform is pointed out. Special privileges to shippers are, in general, a survival of the period of bitter and unrestrained competition for business. With the passing of this sort of competition, and particularly in view of the fact that the railroads are unable to handle the traffic offered them, these special privileges should be done away with by general agreement. Such abolition would, no doubt, injure temporarily certain businesses which have been depending on them, but the change must necessarily come sooner or later, and a time of general prosperity and great volume of traffic, like the present, furnishes both the opportunity and justification for a reform.

A RAILROAD ACCIDENT INVESTIGATION BUREAU.

News of a killing railroad disaster comes by telephone and telegraph to five authorities—the railroad staff; the coroner; the district attorney; the state railroad commission; and the newspapers. While the railroad officers and men are caring for the hurt and dead, clearing the wreck, rebuilding the line, and searching for the cause, the four higher authorities are competing in independent investigations. The evidence is not collated, it is separated. The coroner arrests suspects, seizes broken parts and holds them as "exhibits," halts the officers in charge of removals, and is apparently within the law in enforcing any order. The representatives of the district attorney and the commission are also lawfully entitled to get and keep, if they can, evidence for their own consideration. The newspaper men need no legal enactment for support in their work. They are not to be gainsaid. The result is a skirmish; it is often a scramble. The railroad officers' investigation is methodical, and judicial in form, but between those in charge of train movement, of track and of rolling stock, there is the human temptation to shift responsibility. They work in a storm of criticism, facing punishment, knowing that their findings will not be accepted by lurid critics who see them as criminals trying their own cases. It is disorderly. The railroad company investigations must always be made for railroad purposes, but the four other conflicting authorities are doing harm. An unassailable verdict is a judicial undertaking.

The establishment by congressional action of a bureau for investigating and making public the causes of important train accidents seems to be inevitable, and, if it is wisely planned and officered, should be not only inevitable but beneficent. To prevent erratic action there is needed a full knowledge of the working of similar departments in other countries, combined with the experience and judgment of railroad officers who have had to do with train handling, and also with the larger subject—the relation of the railroads to the public. The hasty introduction of such a bill as is under consideration by the Interstate Commerce Commission is the worst way and is illogical, although it is clearly within the province of the Commission to take the initiative. The subject may be well worth formal consideration by the American Railway Association, whose wonderful membership includes the ablest and best informed men in all departments of the art of transportation.

The British system is a basis for study. For more than 60 years it has worked successfully. There is a Railway & Canal Commission, which is concerned with maximum rates, and is in a limited way comparable with our Interstate Commerce Commission, but the Railway Department of the Board of Trade is the more active agent of government. In practical working, this Railway Department consists of a Secretary, who is in full charge of four inspectors, all of whom are army engineer officers; of two assistant inspectors, and two sub-inspectors. The Secretary's work consists largely of receiving, collating and reporting the statistical returns by the railroad companies and the inspectors' reports. An inspector's function is two-fold:

(1.) Before there can be opened for public use any new lines of railroad or material alteration or addition to an existing road or station or signaling installation or other safety device, an inspector passes on its adequacy and gives permission. It is theoretically possible to appeal from the decision of an inspector, but it is not done; his decision is accepted as final, unless upon further investigation he modifies or overrules it.

(2.) Accidents, resulting in loss of life or personal injury, and collisions or derailments involving a passenger train are referred to an inspector for investigation. In any serious case, the inspector receiving the assignment goes at once to the scene of the wreck, makes a careful examination of everything he can see, receives from the railroad officers all the information and the assistance that they can give him, summons every employee involved in the accident or who has seen any part of it, and then holds a formal inquiry, examining each witness in turn. After gathering all the information possible, he writes a report, which consists of Description, Evidence and Conclusion. The conclusion is apt to be followed by an appendix giving a list of damages done to road and rolling stock, and photographs, drawings, or other data for reference. The assistant inspectors investigate and report on minor accidents to railroad employees and other persons employed on railroad premises.

The important features of an inspector's report given in his conclusions consist of a clear statement of the cause of the accident and such recommendations as he not infrequently makes to the company for a change in its practice. In form, the company is not ordered, and indeed is not legally compelled to carry out the recommendation of the inspector; nevertheless, the relations of the inspector and the railroad officers are such that we know of no case of lasting disagreement, and this relation is due to two causes: The honesty of purpose and intelligence of a Board of Trade Inspectors is beyond question. He is always available for a conference to the end of preventing misunderstandings. Character and ability are absolute essentials for an autocrat, and an industrious officer with such attainments does his good work in the world more swiftly and with less friction than a commission.

An obvious criticism is the restriction of these inspectorships to those who are army engineer officers. It would seem at first sight that railroad officers who have had long experience in handling trains, in maintaining discipline among the employees, and almost daily means of judging the value of safety devices, would be the kind of men to be the most valuable inspectors. This is probably true, but there are difficulties involved in making such selection, and still further difficulties involved in coaxing away from railroad service men of sufficient experience combined with the judicial faculty. Moreover, by so much as the field of selection is enlarged, there is an increase in the chances to appoint men for reasons other than fitness. The personnel of the 35 state railroad commissions in this country, and perhaps in this we may also include the Interstate Commerce Commission, does not indicate that a wide range of possible selection is the wisest method of securing the best qualified officers.

From the nature of his work, the inspector has much leisure time. He has periods of intense application to difficult problems; he does not always succeed in finding the cause of the accident; his term of service is for life or to an age of retirement; he therefore has every incentive to study his business as a science; to learn railroad methods thoroughly; and he has also the time for this work. The writer has never found a British railway officer, who considered the inspector's investigations, decisions and recommendations to be other than a help to him; and this, too, in spite of the fact that the inspector makes mistakes. He may make an error in his finding that a locomotive which has left the track was of a type not safe for the speed at which the company has been accustomed to run it. The company officers may on the other hand believe that the derailment was due to a defect in the permanent way. This does not lead the conservative inspector to make hasty judgment limiting the speed of such locomotives, although his report may be suggestive of such a limitation. No friction between the company and the department results, for the company has ample

opportunity to demonstrate in practice whether or not the type is dangerous, and the inspector is quite as ready to accept the officer's evidence as the officer is to accept recommendations.

We venture the opinion that no American railroad officer, experienced in facing coroner's and other investigations, who will avail himself of the opportunity to attend a Board of Trade Inspector's Inquiry, will fail to be impressed by the advantages of the public investigation by an entirely independent trained judge. In our method, the railroad officer surely wants to find the truth, and his advantage is that he already has a lot of stored information concerning the defects and merits of his track, structures, equipment and men; but information does not imply the capacity to weigh contradictory evidence. A United States District Court Judge, in hearing and deciding a patent infringement suit, with no engineering education or practical experience in mechanics, finds his way through the mazes of the triple valve, interlocking device, track circuit, pneumatic tool and the like—finds the truth and makes it a public record. This public record of the facts obtained by an independent official investigation of the causes of serious accidents, is sure to be of great value to the railroads in their relations to government and to the people.

An act dealing with this subject will become a law, and when it is enforced it may be either a benefit or a hindrance. It is for the railroad officers to decide whether they will either take the initiative in submitting a plan; or in some proper way make their knowledge and results of experience available; or wait for the probably costly results of a law framed by less well informed persons.

NEW PUBLICATIONS.

Reinforced Concrete. By Albert W. Buel and C. S. Hill. Second edition; revised and enlarged. New York: The Engineering News Publishing Co. 499 pages; 6 in. x 9 in.; 144 illustrations. Price, $5.00; cloth.

The first impression formed of this book is of completeness, and the impression is not destroyed by a more careful examination. The two-fold authorship does not mean collaboration, in this case, but that the first part dealing with the methods of calculation and the design of reinforced concrete was written by Mr. Buel, while the second and third parts, dealing with the details of, and methods employed in the construction of various classes of reinforced concrete structures was written by Mr. Hill, so that the volume really consists of two books. This method of construction is, as yet, so young, that absolute certainty in the formulas for strength is impossible, yet enough experimental data are at hand to make a close approximation in what is undertaken. The value of concrete steel as a structural material is to a great extent dependent upon the uniformity of the rate of expansion of the two components and the adhesion of the concrete to the steel. These are worked out with considerable detail, but it appears to be the opinion of the author that it is advisable to use some form of mechanical bond and not depend entirely upon the adhesive strength of the concrete to withstand the tensile stresses. With this brief introduction to the general character of the subject, the second chapter of the first part takes up in great detail the theories of flexure of concrete beams. There is first a resumé of the more important tests that have been made by Kirkaldy, Thacher, Hatt, Miller, Turneaure, Talbot, Harding and Marburg, and here the reader will find the detailed information upon which to base an opinion as to the value of the formulae which follow. In this there is a variation in practice that wavers between the parabolic and straight-line formulas, and it is stated that while the theory of flexure of the straight-line formulae is probably not absolutely true, it has not yet been satisfactorily established by experiment that the parabolic is correct or that it is even on the side of safety. For that reason many specifications and codes require the use of the straight-line formula, though it is acknowledged to be not even approximately correct for ultimate stresses. But it must be borne in mind that few structures are built with the expectation that they will be strained to even an approximation to the breaking strength, so that it does not seem that, for working purposes, a complicated formula, difficult to handle, should be used. The main requisite is that whatever is employed should err on the side of safety. However, it does not seem to the writer "that the time has yet arrived when one set of formulas can be inserted in a book and given to the building professions and trades as the only one meriting consideration." With these limitations in mind the reader will find a complete summary of the work that has been done by the several investigators along these lines, as well as a mathematical consideration of the results obtained. The two following chapters are shorter and deal with the designing of retaining walls, dams, tanks, conduits, chimneys and arches, and the testing of the last.

Part II. is occupied with descriptive matter culled from a wide range of sources, on the various items of reinforced concrete construction. While the descriptions themselves are brief they are very fully illustrated so that there is a valuable collection of examples of the best current practice, and it is needless to enlarge upon the value of such a collection to the designer, regardless of his past experience.

Part III. is equally valuable in the description of the materials and methods used in this form of structure. It takes up the methods of construction used in foundation, building, bridge and conduit work, concluding with a chapter on facing and finishing exposed concrete surfaces. The especial value of this part lies in its suggestiveness, for, though every piece of work of any magnitude demands special preparation and consideration, the knowledge of what has been done before, and has yielded satisfactory results, will always be of great assistance.

The book closes with three appendices giving the details of tests made on reinforced concrete and the methods of mixing Portland cement concretes.

Throughout the whole work there is a constant comparison between American and European practice, and especial insistance is placed upon the advisability of using only Portland cement in concrete-steel construction, though natural cements are sometimes used. In this way the subject seems to be viewed in every possible light, and the final reading of the book confirms the first impression that was formed of its completeness.

Interstate Commerce Acts Indexed and Digested. By Charles S. Hamlin, Corporation Counsel of the Boston Chamber of Commerce. Boston: Little, Brown & Co. 480 pages; 8vo. Price, $3.50.

This is a book primarily arranged for lawyers. Bound in buckram and printed in law book fashion, it puts the various acts to regulate commerce conveniently at hand for a lawyer's library. By this very regularity and accuracy of arrangement it becomes of great value to any who have occasion to refer to the exact provisions of the various commerce laws. The first part of the book is taken up with the text of important laws of the United States relating to the regulation of commerce as officially printed by the Interstate Commerce Commission, these acts being printed in numbered lines with marginal index and comments. There are included the original Interstate Commerce Act of February 4, 1887, and amendments, and the Act of June 29, 1906; the acts in relation to testimony before the Commission; the Acts concerning immunity of witnesses; the Act to Expedite Hearings; the so-called Elkins Act as amended; the Act of August 7, 1888, as to Government aided railroad and telegraph lines; the Safety Appliance Acts, the Resolutions of Investigation of block signal systems, interlocking signals, examination of railroad discriminations and monopolies in coal and oil; the Act of June 1, 1898, as to arbitration between carriers and their employees; the Sherman Anti-Trust Act; the unrepealed provisions of the Wilson Tariff Act as to trusts in import trade; the Act of June 11, 1906, relating to the liability of railroads to their employees, and others. The text of these acts takes up 78 pages. Then follows an index-digest of the six laws which are of special interest and importance to shippers and carriers, followed by a digest of the other less important acts separately. The index-digest takes up one by one the principal words and phrases used in the acts and gives the section, page and line where each reference can be found in the text. This greatly simplifies and expedites reference to any particular subject desired. The fact that the index-digests fill over 400 pages gives an idea of the detailed work involved in the compilation.

Grain Chart. 22 in. x 28 in. Published by R. G. Beker, Frick Building, Pittsburg, Pa. Price, $2.00.

Mr. Beker's grain chart shows in graphic form a mass of data about the production and prices of grain, all over the world, through a series of years. It is compiled from official sources, and is published in convenient form for reference, as a wall map.

CONTRIBUTIONS

The Profitable Weight and Speed of Freight Trains.

Providence, Feb. 12, 1907.

To the Editor of the Railroad Gazette:

Mr. Wild's text, in his interesting and instructive letter of January 29th, is car shortage, followed up by an analysis of train load as related thereto. Almost every cause under the sun can be, and has been held responsible for car shortage or freight congestion. Railroad officers have devoted themselves to a solution of the question for many years. It remained, however, for a business association—I have forgotten the name—which met in Philadelphia the latter part of December to prescribe a concise and comprehensive remedy after a few minutes' discussion, viz.: Congress to open up all waterways; the railroads to be required to double-track all single-track lines and four-track all double-track lines; enlarge all

terminals sufficiently and procure immediately an ample supply of locomotives and cars. The long railroad experience of Mr. Clark, of the Interstate Commerce Commission, enabled him to more correctly diagnose the situation and express the opinion that the public is as much responsible for car shortage as the railroads—both have a duty to perform and should co-operate.

There is a season when the roads are pushed to the utmost to keep cars moving to meet the demands and necessities of shippers. It is then that the public conveniently permits cars to stand empty awaiting load as long as no penalty is imposed, and unload as leisurely. Where the pernicious car-absorbing four-day free limit is permitted by law, the writer has seen cars—and many of them—consume nine and ten days on a short switching haul for which the total revenue derived by the railroad did not exceed two or three dollars. The full four days were used in loading, a day or two in moving the car to destination and another four days in unloading. During this unfavorable weather season, when cars are in great demand, shippers and teamers will let freight houses fill up to the roof waiting for a favorable day when they can get a little more load on each dray. It would be interesting to know to what extent unloading of l.c.l. freight has been improved in Baltimore and Washington, where the Pennsylvania and Baltimore & Ohio roads do their own teaming—i.e., make "store-door" deliveries.

The roads are to blame for the inadequacy of their freight terminals—and for this a by-gone generation must be held to account. Improvement of freight terminals is usually subordinated to caring for passenger traffic, although a road fully prepared to move its freight trains promptly, getting them on and off sidings quickly and into and out of open, smooth working terminals readily will, in all probability, find its passenger train service well taken care of. The one provides for the other. The engineers of the past are responsible for much of the operating officers' present troubles. In an exceedingly busy freight terminal, a 50-car double-end track has track scales planted as near the center as they can be got. There are two 50 or 60-car single-end tracks, with large retail coal plants capable of unloading 30 to 40 cars of coal daily, at the extreme end of the tracks. A small coal plant, unloading two or three cars a week, is located at the switch end of each track. When the small dealer gets a car placed he immediately drops the hoppers and holds the track several days while the large dealer complains because he cannot unload his coal. The section boss' lament comes to mind: "For it's hell if you don't—and it's hell if you do." The engineer also brilliantly planned an ash-track on an approach to the turn-table where an engine could have its fire cleaned, take water, sand and coal at one time. He placed a track alongside for the one ash-car it would hold. When loaded this car has to be staked on the table and after the table is turned is pulled off. The empty car is then placed on the table and roped into the ash-track. The removal of the load and placing of the empty consumes an hour of a busy yard engine's time. These and other awkward situations do not explain to the casual observer why the yard does not handle the business its corps of yard engines and its track capacity would demand.

It is surprising, at times, to note the loss of car and train service by reason of careless train make-up. Insufficient terminals are often largely responsible for it, particularly at the terminals at which roads receive—and deliver—a large part of their freight. Trains are often started in such a manner as to require an entire breaking up and handling of all cars at every large yard passed—and there may be many of these short distances apart; although some of the cars will probably travel from one end of the line to the other and in sufficient numbers to get one or more train loads at the starting point every 24 hours. Initial starting points should make up freight trains to all stations or distributing points for which enough cars run to make a train every 24 hours. Terminals should be enlarged with that end in view. The paradoxical fact should be remembered that starting cars does not necessarily advance them. They should be started right. It is only necessary to take an actual count of the cars despatched on the "chop suey" method from a heavy initial terminal dividing up the handling required at various points and comparing with the reduced handling and increased movement by holding 24 or 36 hours for straight trains, to get a mathematically exact basis of cost. The investigator will be astonished at the large amount of saving in car service, engine mileage, crew wages and yard work to enable enlarging or revising the initial terminal sufficiently to accomplish this end. One of the large eastern roads completed a classification yard a few years ago and has since added a second separating yard at the same point; both operated by humps. In these yards classifications are made and cars held for any point to which business runs sufficiently heavy to start a train once in 36 hours. This system advances freight and increases car mileage.

The economical and expeditious train load has been looked at from all points and no general agreement seems in sight—probably because local conditions enter into it to such an extent that it is usually a case of "try-out." Mr. Wild deducts from his analysis "that there is more net money in speeds of 15, 20 and 25 miles per hour than in speeds above or below these rates." The exhaustive Northern Pacific tests indicated an economical speed of 14 or 15 miles an hour, which corresponds to a schedule speed of 8.75 miles an hour, with approximately 90 per cent. of the maximum rating of the locomotives. The *Railroad Gazette*, October 24, 1902, reviews some interesting heavy train hauls. The writer handled one of these; an 84-mile run with a train of 104 loaded cars weighing 4,014 tons—said to be the heaviest train handled with one engine that distance. This was a test of an extreme possibility; not an example of good railroad practice. With consideration of traffic and geographical conditions, some general rule for rating locomotives may be applied. Approximately, on a division 100 miles long with a predominating eastbound loaded movement, assume a short distance, say 10 miles, of eastbound maximum ascending grade. It would be economy to load to a maximum tonnage, working the lever "in the corner" on the few miles of ascending grade, out of the total 200 miles run, and "cut back" on the remainder of the trip. Were there about 50 miles of a maximum grade instead of a much shorter distance, it would not be conducive to economical or expeditious handling to load so heavily. The locomotive should then be loaded to a point only that would enable it to maintain a speed of at least 15 miles an hour on the heaviest grades, under ordinary conditions, and working steam expansively. This applies to the handling of the train by the locomotive; there are other questions entering into it.

On western lines, with long distances between junction points and larger distributing centers, the heavy train, with reasonable limitations, is not only economical but advances traffic as it reduces the units the train despatcher has to provide for. In eastern countries, with short distances, crowded terminals and a dense passenger traffic, the reverse may be true. A freight train must be able to quickly get out of the way of passenger or high-class freight trains, as quickly return to the running track or cross from one track to another. If traffic is very dense it may be desirable that all trains maintain a uniform speed. At the terminals it must not exceed the length of the tracks provided to receive it to prevent obstructing following trains.

J. A. DROEGE,
Division Supt., New York, New Haven & Hartford.

The New American Semaphore Code.

London, Nov. 19, 1906.*

TO THE EDITOR OF THE RAILROAD GAZETTE:

The American Railway Signal Association's declaration of independence, published in your issue of October 26, comes as a bolt from the blue, and is a challenge to our British signal tenets, especially as regards the use of distant signals.

There are three fundamental innovations, viz.: (1.) The use of not less than two lights for any high-speed signal. (2.) The abolition of the distant signal as a separate signal, and the use of the caution function of a three-position home, starter or advance signal instead of the danger or "on" function of the abolished "distant." (3.) The use of two lights placed diagonally in relation to a vertical line to denote an automatic block signal. The use of the German raised arm for caution and clear functions is also noteworthy.

There can be little doubt that the raised arm is preferable to the lowered one, because it better ensures the return of the arm to horizontal position by gravity. The use of not less than two lights for a high-speed signal is a distinct improvement, for it not only acts to a certain extent as a safeguard against the danger of an extinguished light, but also the second light enhances the value of both the green and the yellow lights. Any observer will have noticed how much more distinct is the color of a yellow or a green light when seen along with a red one. As shown in the diagram, page 369, position No. 16 of the automatic block signals would be confusing to enginemen. In my opinion the upper arm should be horizontal with a green (?) light.

So much for innovation No. 1. Now for the distant signal question.

On the surface this question may appear to be fairly simple, but like most simple things, it will be seen on close examination to be very complex, and to involve us somewhat in philosophy for a determining of whether to treat the matter objectively or subjectively. Let us consider one or two main points. In the first place we must put ourselves in the place of an engineman. Now, all considerations of distant signals presuppose high speeds. That being the case I wish to show that the distant signal is of more vital importance than the other running signals.

Let us try the test of elimination.

Given a train running at high speed round a curve with conditions imposing a very limited view ahead, and approaching another train standing with red tail light and protected by only a

*The delay in printing this letter, for which the Editor begs to apologize, is due to its having been lost after it reached New York.

distant signal, say 1,200 to 1,500 yards in its rear. If this signal is acted upon there will be little danger of a collision.

Given the same conditions with the exception of a home signal 100 yards in rear of the standing train and no distant signal, a collision would be probable.

It thus appears that the distant signal is of predominant importance and in the horizontal position of the arm it should be spoken of as at "danger" and not at "caution" (although the American Signal Association has recommended the latter) for it is necessary to instil into the minds of the enginemen and others the extreme importance of acting promptly upon the distant signal warning when running at high speed.

This state of mind is not likely to result from the use of the word "caution" in connection with the distant signal, and, in fact, instead of the reading "Proceed Cautiously" it should be "Stop Vigorously" in view of the fact that a fast train may take from 500 to 1,000 yards to stop in after sighting the distant.

It is customary in this country, and I think rightly so, to speak of a distant signal in the horizontal position as at "danger" or "on."

For the above reasons we should object to the half-way position of the home arm to substitute the separate distant arm at danger, for it naturally gives the meaning "proceed cautiously" instead of "stop vigorously" as it should.

When one considers Grantham and other similar accidents it is clear that subtle mental effects must be taken into account.

I have followed with interest the development in America of the yellow signal light. My letter in advocacy of this light in the *Railroad Gazette* of November 23, 1894, was written when the amber light had few friends.

The first suggestion for the use of diagonal signal lights as a distinctive signal, will be found in a communication about the year 1881 to the Institution of Civil Engineers from a well-known signal engineer now resident in New Jersey.

As regards the mechanism required for a three-position signal, it is, of course, readily accomplished by a well-designed power machine.

With the American compensated two-wire connections, or with rod connections, it may be accomplished fairly well, except that the slotting would not be very sure for three positions, if done entirely by rods or wires for a signal 1,500 yards away.

ARTHUR H. JOHNSON,
Telegraph Engr. and Supt., London & South-Western Ry.

Car Famines; Their Causes and Remedy.*

It is not scarcity of cars but abuse of them that causes car famines. Shippers of freight in all sections of the country suffer more or less from a scarcity of cars during the busy season of the year, but the heaviest burden always falls on the small shipper, especially at non-competitive points on the different roads, because his only alternative is to wait until cars can be supplied him. The abuse of the box car is not caused by the traffic department, but by the operating department. It is imperative that the operating management of a railroad furnish sufficient facilities to handle the business secured for them to move by the traffic department, which has not been done. In the city of Chicago the tonnage handled in the past 10 years has increased 85 per cent., and the facilities for handling this business have increased not over 27 per cent. What is the result? Congestion and blockades, causing hundreds and thousands of cars to be held out awaiting an opportunity to deliver their cargo. With sufficient terminal facilities these cars should have been unloaded and returned to the different points along their line, and I will venture to say they could make two or three load carrying trips in the time that under our present congested condition they are held up at some point waiting to be unloaded.

Railroads should build freight and storage yards a few miles out from all large centers, were incoming freight could be held until the actual delivering and unloading yard could handle the freight with quickness and despatch. This would in a great measure relieve car shortage.

In a short time after the yearly grain carrying season begins the cry from the grain shipper is, "More box cars." Why? Because, when all the available cars have been loaded, the usual congestion occurs, and instead of these cars being rushed to the different markets, unloaded and returned for more loading, they simply become storehouses on wheels, lie around the different sidings and terminals, and it is days and even weeks before they reach their ultimate destination.

My opinion has always been that the different trunk lines have too many cars. In addition to the number of cars being actually loaded and unloaded each day, a road should not have more cars on its line than it has power (locomotives) and facilities to move each day. Under this condition congestion is impossible, and a road would always have enough cars to handle its business without complaint of car shortage. Suppose that during a congested condition a road should purchase 3,000 or 5,000 new cars and at once distribute them to the different shippers: this would relieve the situation, say, for 10 or 15 days. Then, when the cars are loaded, there would be so many more cars to add to the already congested condition, and matters would be worse than before the new cars were received.

A carload of freight was recently shipped from a point in Illinois to a town here in Iowa—200 miles. This car was 18 days covering the distance. On tracing it up it was found that the car had not been in bad order, but had simply been lying around terminal points and different sidings on account of a congested condition of the road; and still this road is short of cars.

Another cause of car shortage is improper handling of the earning capacity of a car by operating officials who have a mania for making a showing of tons hauled per train-mile by their trains. While a good showing is creditable, it is one of the causes of car shortage. The trouble is caused by overloading freight trains, giving these trains a tonnage that they can just drag over the road. Take a freight division that a train should cover in 10 hours; these "drag" trains take 20 or 25 hours to get over. An economical dead freight train should cover a 500-mile territory in 40 hours, yet it takes drag trains a week or 10 days to cover the same territory. Under the present system of overloading freight trains, road congestion is caused, which is as bad as yard congestion; and a road that practices this system can be sure that its house and passing tracks will be blocked with cars waiting to be moved, its train and engine crews worn out, and its engines in a condition in which they cannot give even light tonnage a reasonably good movement, because they are so long between terminal points that when they reach a terminal they cannot receive the necessary running repairs, as they are first out, the yard is blocked and it is necessary for them to be called on to relieve the situation.

I once worked under a superintendent on a 100-mile division. During a heavy rush of business he immediately cut down the tonnage on our trains so that we could cover the 100 miles in four or five hours, and on leaving the heaviest freight originating terminal he would say: "Now hurry back, boys, and get some more." The consequence was, the crews and power were always in good shape. We frequently covered the division three times in a day. More freight moved with less expense, and we did not know what road or yard congestion was.

One of the chief causes of car shortage can be attributed to the mechanical department. With few exceptions you can ask any employee of the different lines in this territory what is the condition of their power, and the universal expression is, "Very bad." In all cases of retrenchment and curtailing of expenses the mechanical department is the first to suffer. Good power is the very sinew and backbone of a successfully managed railroad, and this department should be the last to suffer. A locomotive is given a general overhauling, placed in service, and with proper care and running repairs regularly attended to, is expected to cover, say, 100,000 miles before another general overhauling. As soon as placed in service she immediately begins the "straining process," overtaxing her capacity, hauling drag trains, not receiving the necessary running repairs because of shortage of power, and before half the required mileage is made she requires shopping again, which she does not get, but must eke out a miserable existence until the other 50,000 miles is covered, as the policy of economy adopted by the road has only allowed so much money with which to maintain the locomotive for each 100,000 miles run. The road whose power is in poor condition can expect nothing but congestion, and congestion is the only cause of car shortage.

Before 1900 the car shortage problem had not assumed such a serious aspect as it does now. Yet to prove that this shortage should have diminished instead of increased I will quote you a few figures I have compiled from an authoritative source. In 1895 there were 85,227,515,891 tons carried one mile; in 1905 there were 186,463,109,510 tons carried one mile; an increase in 10 years of 118 per cent. From the year 1895 to the year 1906 there were built 1,305,205 freight cars—an increase of about 105 per cent. The carrying capacity of these cars increased 75 per cent., making a total increase of 180 per cent. The increase of freight in 10 years was 118 per cent., and the carrying capacity increased 180 per cent. With our improved terminal facilities, increased double-track mileage, heavier power and various other improvements, conditions should have improved in these 10 years and there should not be a shortage of cars.

The total estimated amount spent in the past year for new rolling stock and motive power was $380,000,000—an increase over last year of about 45 per cent.; but our most sanguine traffic official will not say that his increase of business has been anywhere near this figure. The proper solution of this vexatious question is, Better terminal facilities, increased and better motive power and not so many cars.

*A paper by P. B. Vermillion, Conductor on the Chicago Great Western, read on Jan. 11, before the Iowa Railway Club.

Successive Experiments and Improvements on Locomotives of the Pennsylvania Railroad.

BY C. H. CARUTHERS.

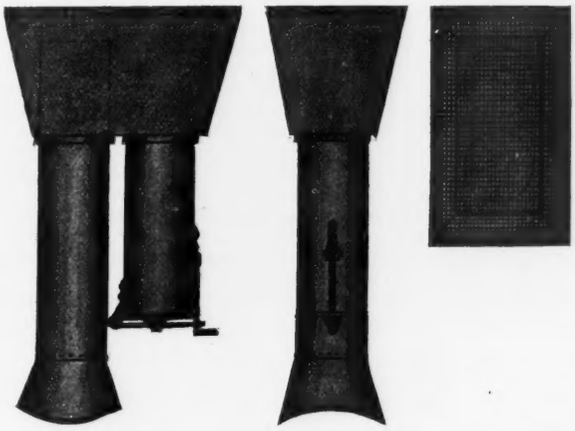
Although the Pennsylvania Railroad has always been considered very conservative in adopting improvements, it has almost from its earliest beginning shown a willingness to submit any reasonable device or suggestion to the only true method of determining its merits or demerits, a thorough test in the regular service of the department most likely to receive benefit from it. These tests not only have the benefit of the skilled office forces of the company, but also that of the practical experience of the large number of able employees who handle the various equipment and plants of the company.

As on most large railroads, the locomotive equipment of the company in its earlier years was of very diversified types, but this diversity was chiefly in form of construction and arrangement of parts, the essential features being the same in nearly all cases.

It will be understood of course that the time of first use or adoption as standard of any device alludes to the Pennsylvania Railroad only, without regard to a possible trial or adoption of the devices at earlier or later periods on other lines.

Probably the first attempt at a radical improvement was the introduction of the Loughridge continuous brake which closely followed the experiments in smoke-consuming previously described in the *Railroad Gazette*.

The older officials and trainmen will remember this brake, which consisted primarily of a transverse shaft carried in movable boxes behind the rear pair of driving wheels, and carrying on one end a friction wheel about sixteen inches in diameter with its periphery grooved to fit the flange of the rear driving wheel against which it could be drawn by a hand lever extending upward through the footplate, while another lever controlled its retention in braking or release positions by means of a pawl and ratchet also fixed upon the shaft and its frame. The braking was effected by means of a chain which united this transverse shaft to a series of chains extending back to the brakes of the tender and following cars. Although an attempt to equalize, or take up, the lost motion of the various parts was made under each car by the use of a swinging frame containing a number of small sheaves, the result obtained was far from satisfactory, and from a high efficiency on the tender and first car, its power gradually diminished until at the fourth or fifth car it had almost dropped to zero. Hence on the local trains where its use was the most severe, the wheels under the tenders and baggage cars required very frequent renewals. While its efficiency was far superior to that of the hand brakes, yet it often



Side (right). *Front.* *Top.*

Smokestack, Winan's "Camel," 1853-1863.

failed on account of the chains breaking when making a sudden stop in time of danger. This was probably owing to the fact that the engineman in his anxiety to avert disaster allowed the friction wheel to remain too long in contact with the driving-wheel, and of course "something had to go." This friction wheel can be seen on the picture of engine 135, directly behind the rear pair of drivers. With all its faults, it was the best brake at that time available, and its use on the passenger trains of the company was continued from 1861 until the adoption of the Westinghouse brake in the latter part of 1869.

This Westinghouse brake had been experimented with for a time on a local train between Pittsburg and Wall (now Pitcairn), and when the National Association of Master Mechanics met in Pittsburg in September, 1869, the train fitted with it was used to carry the members of the body on an excursion to the Altoona shops of the company, and to other points of interest on the division. At that time the Westinghouse brake was of the direct-acting, or "straight air" type and consisted simply of the pump, main reservoir, and three-way cock on the engine; with the train-pipe connected by rubber hose between the cars and attached directly to the brake cylinders. This train pipe was divided into two parts at each end of each car, necessitating the use of two sets of hose connections. This is said to have been done in order to distribute the pressure when an application was made and thus lessen the danger of blowing apart the straight form of couplings used; nevertheless this blowing apart frequently occurred, but as each coupling was provided with an internal checkvalve, the braking power was affected by it but little.

About 1873, the type of coupling in use at present was adopted and the double line of pipe at the coach ends was dispensed with, but the check valve was used in the improved couplings until the introduction of the automatic brake,

Diamond, 1873-'92. *Straight*, 1859-'62. 1870-'81. *Straight*, 1881-1900.

Pennsylvania Smokestacks.

when it was of necessity taken out and angle cocks were placed in the train pipes. The automatic was not generally applied to the company's equipment until some time during 1876, and was so arranged as to enable straight air to be used when desired. The few freight engines at that time provided with air brakes had straight air, and therefore when an emergency required the use of any of these engines in passenger service, straight air only could be used on the train. A fourway cock in connection with the triple valve enabled this change to be quickly made. When the handle of this cock stood line and line with the trainpipe, automatic air was in use; when it stood vertically, pointing downward, straight air was operative, and an intermediate position cut the air out from the car on which the cock was placed in such position. In 1887, the improved quick action automatic was applied and straight air abandoned, a straightway cock between the triple-valve and the trainpipe replacing the former four-way cock. The later improvements and adoption of the high speed automatic, etc., are of so recent a date and are so familiar to all railroad men as to require no especial mention in this article. Of course, the primal introduction of the automatic brake and its continued improvement from time to time soon showed the necessity of a better means of controlling it and regulating its supply of air, and the present type of engineman's valve and the pressure regulator were designed to replace the three-way cock and simple little relief-valve of straight air days. In short the company adopted all improvements of the brake almost as rapidly as they came out.

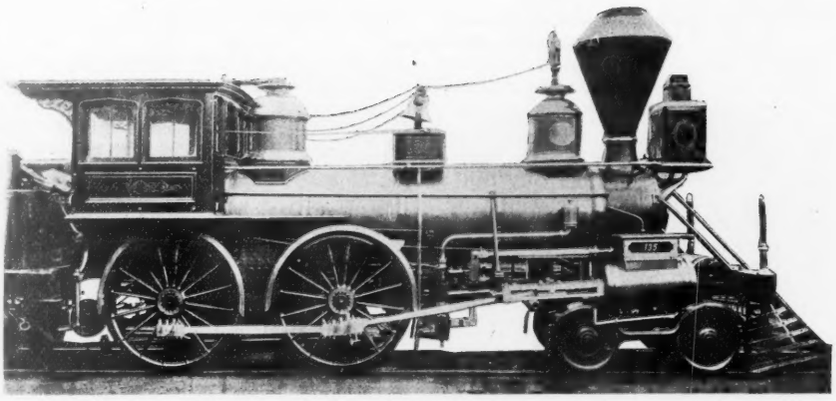
The air signal was first applied about 1881 or 1882. In 1887, as a result of a serious accident on another line which was attributed to some unauthorized person tampering with the emergency cord in a parlor car, a circular was sent out to every employee in the passenger train service of the company, asking whether such instances had at any time come to their notice on the trains in their care, their personal opinions as to the merits of the cord, and whether they thought it wise to retain it, or to replace it by a cock with a projecting handle at one end of each coach, as is customary on some lines. The replies were almost unanimously in favor of the retention of the cord, and it has remained ever since.

Brakes on driving wheels were not used until one or two years after the adoption of the Westinghouse brake. The first used a system of connected levers between the shoes, but these were soon followed by the toggle-joint type still found on many of the company's older engines. In 1892 and 1893 the American and allied types of driver-brakes were applied to many new engines and have been the standard ever since.

An interesting experiment in the use of a limelight for the headlight was made in 1866, and its seeming success caused it to be afterwards applied to many of the passenger engines, but at the end of about one year's service it was taken off, one reason assigned for this being difficulty in preventing too great concentration of the rays of light in a single narrow line. The half-tone of engine No. 135 also shows this arrangement, and the necessary reservoir can be seen in front of the smoke arch. In 1883 the size of the headlight reflectors was reduced to sixteen inches, but the

square case has always remained a standard, except on a few special engines where the circular form has been used. Thus far the company has not given the electric headlight much, if any, attention, and there does not appear to be any desire among the enginemen for its introduction.

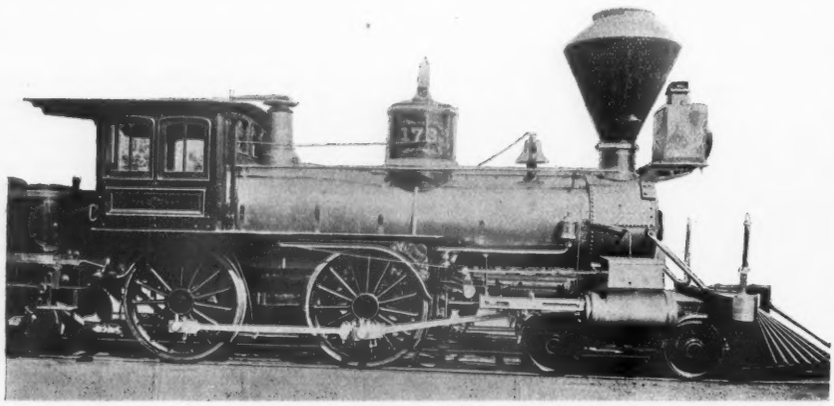
The cowcatchers of the engines from the opening of the road were usually moulded on graceful lines and extended considerably in front of the bumper. Until 1867 all were of iron with transverse slats, except on a few Norris engines built in 1858, 1862 and 1863. These were of vertical wooden bars, but were soon replaced with others of iron. In 1867 those of wood with bars placed vertically, were adopted for passenger engines, and have remained as standard for that service ever since. Within the last five years the form of the cowcatchers on both passenger and freight engines has been materially changed, and the standard now extends but slightly beyond the line of the bumper, of course greatly increasing the pitch. At one time hickory brooms were attached to the bumpers, one on each side, immediately behind the cowcatcher, with their lower ends set close to the rail, in order to sweep away snow or other light obstructions. These have not been used for many years.



Number 135 (Leopard)—Built by M. W. Baldwin & Co., 1857.

Showing reservoir for lime light used in headlight in 1866, and friction wheel to operate Loughridge continuous chain brake.

Until 1859, the smokestacks were all of a large balloon type on practically the well-known French & Baird lines of those days. The only exception to this was in the case of eleven Ross Winans "Camel" engines which retained the peculiar design placed upon them by Mr. Winans at his shops. In 1858 the straight stack with a neat cast-iron cap was introduced in connection with the experiments in smoke-consumption referred to, and until 1862 was applied to all new engines and also to many of the old ones, but as it was entirely open, many large coals were thrown out and frequent fires in buildings along the line resulted. This induced Mr. John P. Laird, then Master Mechanic at Altoona, to design a stack which was a sort of compromise between the large balloon with its full netting, etc., and the straight open stack with no spark arresting device whatever. This Laird stack thereafter became the standard for all passenger engines and was used on many freight engines, although between 1862 and 1866 there appeared to be a "renaissance" of the old balloon type, and many were again used on freight engines during those years. After that time the Laird stack was applied to all engines except those especially built for shifting purposes. These used a stack similar to that of the anthracite coal-burning freight engines of the Reading Railroad. In 1870, James Smith designed a type of spark-arrester, for use in connection with straight stacks of the pattern referred to as applied to the smoke-consumers from 1859 to 1862, which proved very successful, and during the following two years was applied to a large number of both freight and passenger engines, but the amount of fire still thrown out was found to give some trouble, and in 1873 Diamond stacks began to replace the Smith stacks on freight engines, and were also applied experimentally to some of those in the passenger service. Here, however, the fine dirt thrown from the Diamond stack proved very annoying to passengers, and the Smith stack once more resumed its place in that branch of service, but not until one supreme test of the two stacks had been made. This test was conducted on the Pittsburg division on engine 654, which ran a heavy express train each way daily between Altoona and Pittsburg. It was in charge of two enginemen, who, of course, ran it on alternate days. After the first two days of this experiment, the Smith stack was removed and a Diamond of the Jewett type which had been claimed to have produced excellent results on the Pittsburg, Columbus, Cincinnati & St. Louis Railway (as it was then called), was substituted for the Smith, and was used during the next two days. Thus the test was continued for at least one month, and resulted in a sweeping victory for the Smith stack, which met no further competitor in the passenger service until the coming in of extension fronts in 1881, and even with these, the ornate exterior form of the stack was retained until 1885, when the first of the plain straight stacks put in an appearance.

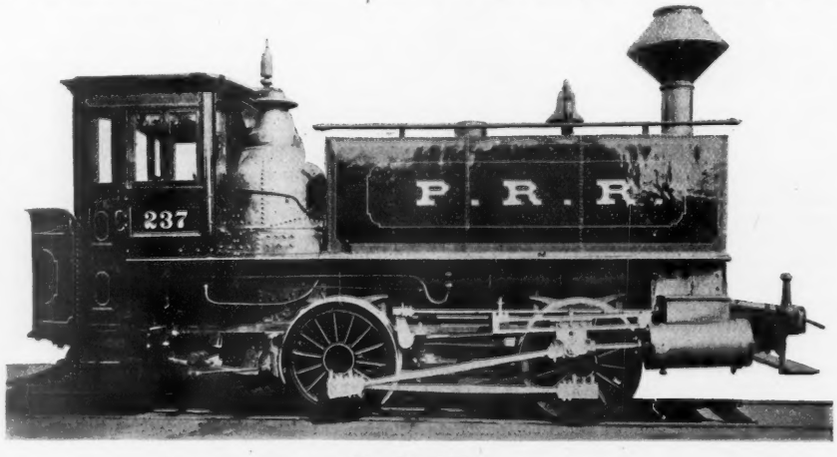


Number 173.

Showing sandbox encircling dome. Boiler from state engine Nebraska. When the Pennsylvania bought the state improvements in 1857, the Nebraska was a Baldwin engine with 4 drivers, 60-inch, and 17 in. x 24 in. cylinders set at a steep pitch. Rebuilt at Altoona, 1866. All except boiler is new.

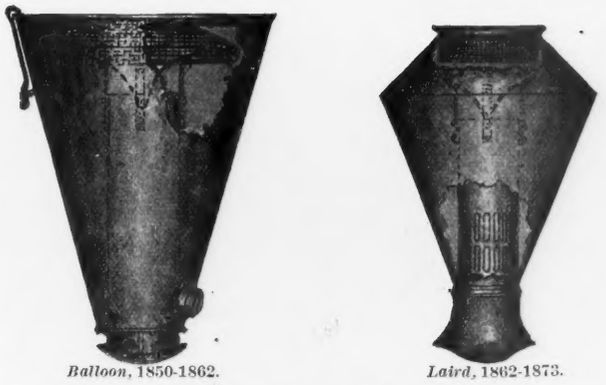
The extension front was not placed on all freight engines until after 1885, and only on passenger engines using soft coal, until 1882. In that year it was also applied to the hard coal burners. Since its introduction this feature has undergone some modifications to adapt it to the different classes of engines, and a pipe, which at first extended from the lower part of the boiler to the cinder-space and was fitted with a globe valve to enable water to be turned into the cinders when cleaning out or in case of their taking fire, has been discarded; probably because it frequently became so clogged with sediment as to be unserviceable.

Bells on Pennsylvania engines have been placed in almost every possible position between the stack and cab, and two attempts have



Number 237.

Built on boiler of old Westmoreland, 198, bought from the state in 1857.



Balloon, 1850-1862. *Laird*, 1862-1873.

Pennsylvania Smokestacks.

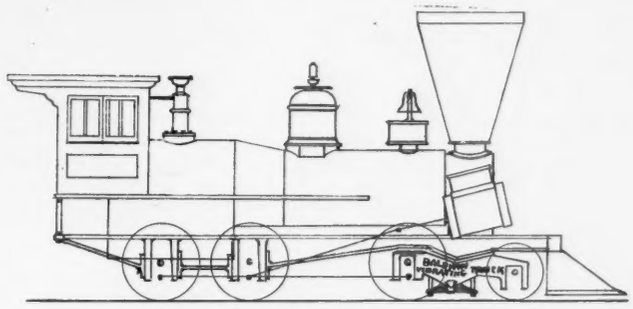
been made to substitute large gongs for them. Thirty-three of the first freight engines, including the "Camel" pushers referred to, were built without bells and ran thus for several years, the Camels until 1862.

In 1860 Mr. Laird rebuilt a passenger engine with the sandboxes under the running board as in English practice, and it was followed by several others, both freight and passenger, from both Altoona and Baldwin's, on the same lines. After two or three years' service this arrangement was found to be unsatisfactory on account of the sand used in this country packing in the boxes and refusing to flow, hence by 1867 the sandboxes of these engines again occupied positions on top of the boilers. In 1881 the high-speed class K engines came out with the sandboxes under the running board, and this practice was followed on all new passenger engines built thereafter until 1893, when it was again abandoned. Since that time all sandboxes have been placed on the top of the boiler and those under the running board have been removed. In 1900 a semi-circular, or crescent-shaped sandbox fitting closely to the front of the dome and concealed by a combined casing which gave the appearance of but a single part to both dome and sandbox, was applied to a number of passenger engines and is still retained upon them. The sand pipes on these engines are concealed under the boiler casing, and this practice was followed for a time on later engines with sandboxes in the usual position, but latterly these pipes have been placed on the outside of the casing.

In 1889 the first engines were built at Altoona with domes having no mountings, the pop-valves and whistle occupying a small cover directly over the roof-sheet, as in English practice.

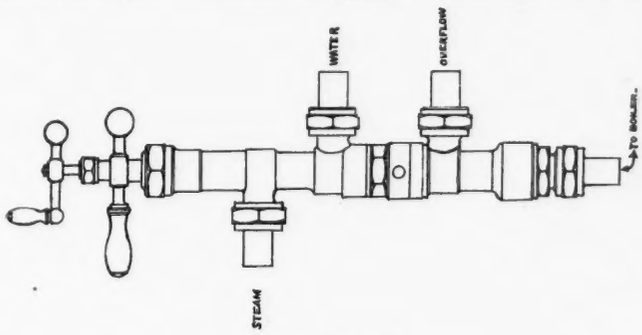
Link motion was finally adopted as the standard valve-gear in 1861.

Injectors were first applied to the engines in 1861. These were of the Giffard type and were placed under the foot-plate with the check-valve on the rear wall of the firebox casing, just above the mud-ring. This location caused leaks, and in a short time all these check-valves were removed to a point well forward on the side of the boiler barrel. At first but one injector was used on each engine, with no other means of supplying water to the boiler. Even old engines which received injectors had the pumps taken off. The delicate character of these early injectors produced frequent failure of working, and engines were often hauled in "dead" on this account. Hence two injectors were put on subsequent engines, or sometimes one injector and one "squirt," but although improved types were introduced, the trouble with them continued, and late in 1864 the standard of equipment became one injector on the left side of the engine and one pump on the right side, which arrangement prevailed until 1878, after which the pumps were gradually removed and two Sellers injectors of the 1876 type, or their equivalent, to each engine, has been the practice since. Between 1863 and 1865, a number of the engines of both freight and passenger service, had only the Sellers non-adjustable "squirt" as a means of supplying the boilers with water, and but one of these to the engine, yet they appeared to have no more trouble than engines using the adjustable type. Check-valves placed in the cab were tried on some shifting engines in 1882, but for some reason were found to be unsatisfactory. In 1885 internal check-valves were adopted and have been used on all equipment since.



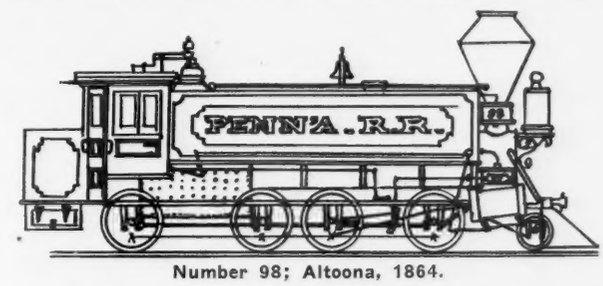
Number 45, as Remodeled at Altoona in 1864.

30-in. wheels replacing first pair of drivers. Vibrating truck containing these 30-in. wheels and first second pair of drivers moved ahead.

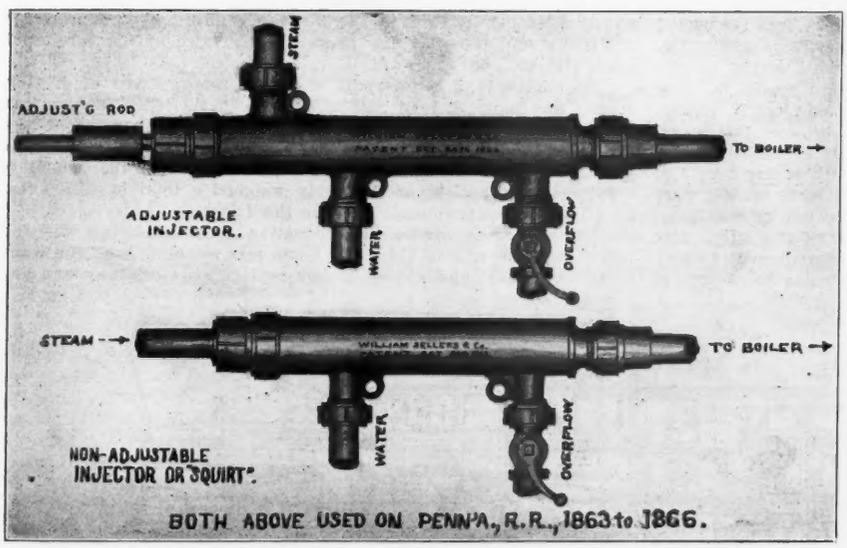


Giffard's Injector.

As used on the Pennsylvania, 1861-1863.



Number 98; Altoona, 1864.



Pennsylvania Injectors.

"Pop" valves were first applied in 1867, and until 1885 the practice was to have one pop-valve and one spring-balance lever safety-valve on each engine, but since the date mentioned all the spring-balance valves have been removed and replaced by pop-valves. Previous to 1867 two spring-balance valves only, were used, usually placed on the dome cover, although on some of the older engines but one occupied this place and the other was on a column some distance from the first.

Tallow-cups were first placed in the cabs in 1861, and bridges were first used in 1875.

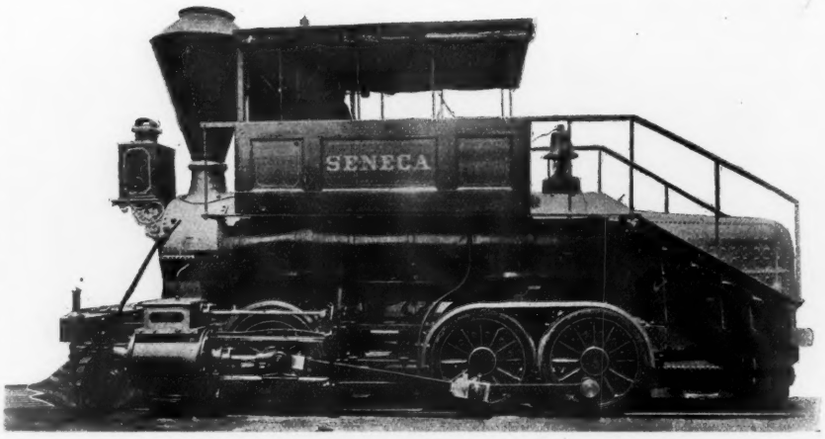
Sight-feed lubricators were not generally adopted until after 1883.

Solid end parallel rods were adopted for all classes of passenger engines in 1883, and for freight engines in 1885. They had, however, been in use on the class K fast express type from July, 1881. Belpaire fireboxes were first used on freight engines in 1885, and on passenger engines in 1889.

Although the two-wheel truck has undergone considerable change since its introduction on the road in 1862, the four-wheel trucks have been of the Bissell type since early in the fifties. The only change in them of note was placing the equalizing bars between the frame and knee brace instead above the frame after 1865; and from 1868 until 1878 mounting the center-plate on an independent frame hung from the main truck frame by four staggered eye-bolts in such a way as to afford a slight lateral motion in rounding curves and thus reduce the shock. About the time that nearly all of the engines with four-wheel trucks had been fitted with this device, some one came forward and substantiated his claim to a patent upon it and demanded what was thought to be an excessive royalty for its use, whereupon oaken blocks were at once placed between this auxiliary frame and the main frame to practically render the trucks rigid, and as rapidly thereafter as possible, they were all changed to the ordinary rigid type still in use.

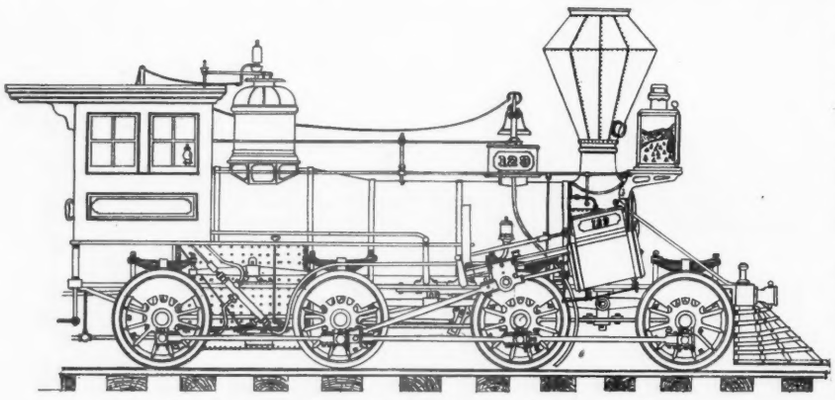
Tenders arranged for taking water from troughs while running, have been in use since the latter part of the sixties, and since 1896 this device has also been applied to the tenders of many of the freight engines.

Probably the most numerous experiments in remodeling locomotives which has ever been made by any railway, in proportion to the number in service, were made by the Pennsylvania Railroad Company between 1861 and 1866. Many of these experiments were dangerously near the class of "freaks." In 1862 the Ross Winans



Number 131 (Seneca) as Rebuilt at Altoona in 1862.

Originally a Ross Winan's "camel," built in 1856. The cab, boiler, barrel, dome, throttle, smokebox, cylinders, steam chests, parallel rods and side rods are original. All else is new.



Number 129—After Remodeling at Altoona in 1864.

camel, Seneca, No. 131, which had been built in 1856, was remodeled at Altoona. The boiler barrel, smoke-arch, dome, Winans throttle, original cab with canvas curtains instead of windows, cylinders, steam-chests, and solid-end parallel rods. All else was new. The firebox had considerably less slope in its roof and crown sheets, and the new frames were of the standard bar type of the period and carried back to a transverse bar at the rear of the firebox as on other classes of engines. A leading truck with a single pair of wheels was introduced, and the three pairs of driving wheels were so spaced that in connection with the truck the engine was practically a mogul. It ran in this rebuilt form until the latter part of 1870, when a broken main driving-axle damaged it considerably and it was cut-up; in line with the policy adopted to so dispose of all old types of engines requiring extensive repairs.

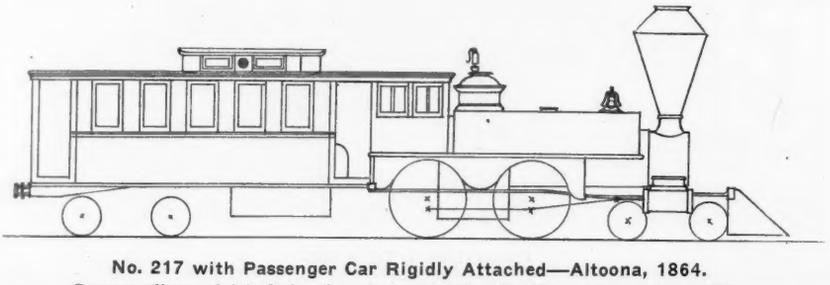
The remaining ten camels were all later rebuilt with similar frames and running gear, but the boilers were made flush-top with cabs of ordinary type placed over them at the firebox end, as in long-firebox engines of to-day. All but one of the ten received new cylinders with saddles, and all, like the Seneca, received link-motion, but the Winans dome and safety-valves were retained on the entire lot, being placed on the roof-sheets and covered with jackets of Russia iron. In fact, on most of these ten, nothing remained of the original engines except these domes and throttles and the three rings of the boiler barrels.

Eight Baldwin eight-wheel connected engines on the road at the time of these experiments in rebuilding, seemed to afford a special field for inventive genius. No. 98 was rebuilt at Altoona with the eight drivers placed closely together between the cylinders and fire-box, with a leading truck, having a single pair of wheels, in front of the smoke-box, the whole forming a very fair prototype of the later consolidation engines. A huge saddle tank covered the boiler, and a large coal-bunker was located behind the cab. For some reason Mr. Laird soon removed the second pair of drivers from their original position, to one under the coal-bunker. Thus arranged, the forward part of the engine resembled a mogul. As the leading truck had but little provision for rounding curves, and the re-arrangement of the driving wheels evidently offered no better solution of the trouble, the 98 is said to have been "splendid on a straight line, but a terror on curves," and to have spent almost as large a part of its existence on the ties as on the rails. Notwithstanding all this, official records published in 1868 mention engine 97 as of same design. Although frequently through Altoona shops and roundhouses, and over the road, in those days, I never saw the 97 after its rebuilding in this way.

Engine 45 was another of practically the same design as the preceding two, previous to their remodeling, although somewhat smaller and having but 18 in. x 20 in. cylinders and 42 in. driving-wheels instead of 19 in. x 22 in. cylinders and 44 in. driving-wheels as on the other two. In this engine Mr. Laird satisfied himself with substituting a pair of 30 in. wheels for the forward pair of driving-wheels, but retained the Baldwin vibrating truck, merely adapting its front end to the new conditions, by lengthening it slightly and lowering the pedestals. He also moved this truck about sixteen inches forward.

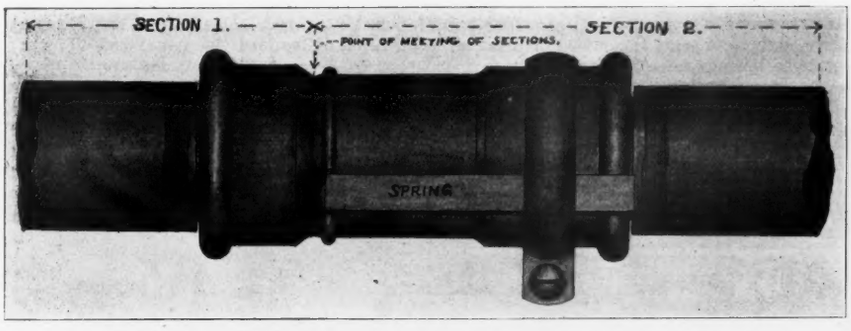
On engine 44, a counterpart of 45, the forward pair of driving-wheels was replaced by a pair of chilled wheels 48 in. in diameter. I was never able to ascertain why this peculiar arrangement was used. Of course, these changes on both 44 and 45 changed them to six driver connected engines, and deprived them of the benefit of considerable adhesion, as they only weighed a total of 63,700 lbs., all of which had previously been on the drivers.

The crowning stroke in remodeling these Baldwins was certainly made on engine 129. The dome was removed from the waist to the roof-sheet and a deep firebox replaced the original long and



No. 217 with Passenger Car Rigidly Attached—Altoona, 1864.

Car was afterward detached and ran independently with 251; sister engine to 277.



First Hose Coupler Used on Westinghouse Airbrake, 1869-1873.

shallow one. New frames were also made, and the eight pairs of driving-wheels were retained, but spread as far apart as the length of the engine would permit. The front pair was fitly designated, as it was placed at the extreme front end of the frame, between the bumper and the smoke-arch. The rear pair was under the foot-plate, directly behind the firebox, and the other two pairs occupied positions about uniformly distant from the rear and forward pairs, and from each other. This engine is said to have equalled the 98 in taking short cuts at curves.

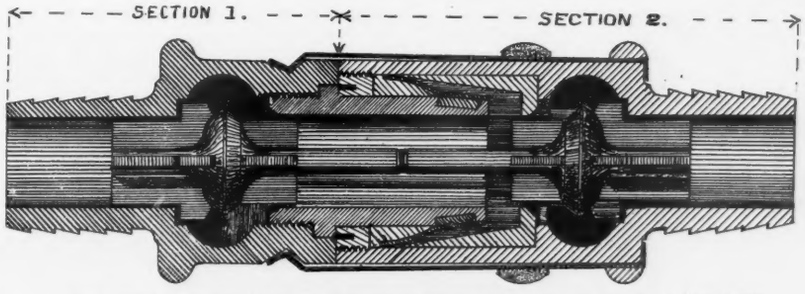
About the same time several small Baldwin passenger engines with semi-circular fireboxes and "haystack" domes, received new fireboxes of rectangular form, but used the old domes on the new roof-sheets. An old Norris engine of similar type which had been lying at Altoona for a long time as the result of a boiler explosion, was rebuilt as a saddle-tank shifter with the eccentrics on one axle, and the main pins on the wheels of the other. In this engine the exterior of the semi-circular firebox was retained with its surmounting haystack dome. Probably the next experiment was made with engine 256, a comparatively new Baldwin ten-wheeler. Instead of a separate tender, the engine frames were pieced at the rear to a length of about 12 ft., terminating in a bumper to which was attached a cowcatcher and a cast-iron drawhead. This extension of the frames had two pedestals in which the boxes for an additional pair of driving-wheels were placed, and these wheels were connected to the pair in front of them by parallel rods in the usual manner. A tender about 10 ft. long and 4 ft. high, with compartments for coal and water, was placed on the top of this extended frame. This engine possessed many of the objectionable features of the 129 and 98, with little to offset them, and after a brief trial it was relieved of its "improvements," restored to its "good old way," and rendered ten or twelve succeeding years of efficient service.

After this, a small Baldwin saddle-tank passenger engine had its frames extended and a small passenger car about the length of a standard four-wheel cabin-car was built on this frame for the use of officials of the road. This arrangement was also short-lived, and the car was then detached and placed on a truck similar to that used under cabin cars, and for several years thereafter served as a special car for Robert Pitcairn, Esq., superintendent of the Pittsburg division, being used in connection with his special engine of the same type as that to which the car had previously formed a part.

With the rebuilding of four passenger, and a number of freight locomotives as moguls, the craze for improvements rested for a time, probably on account of the adoption of fixed standards for engines for freight, passenger or yard service.

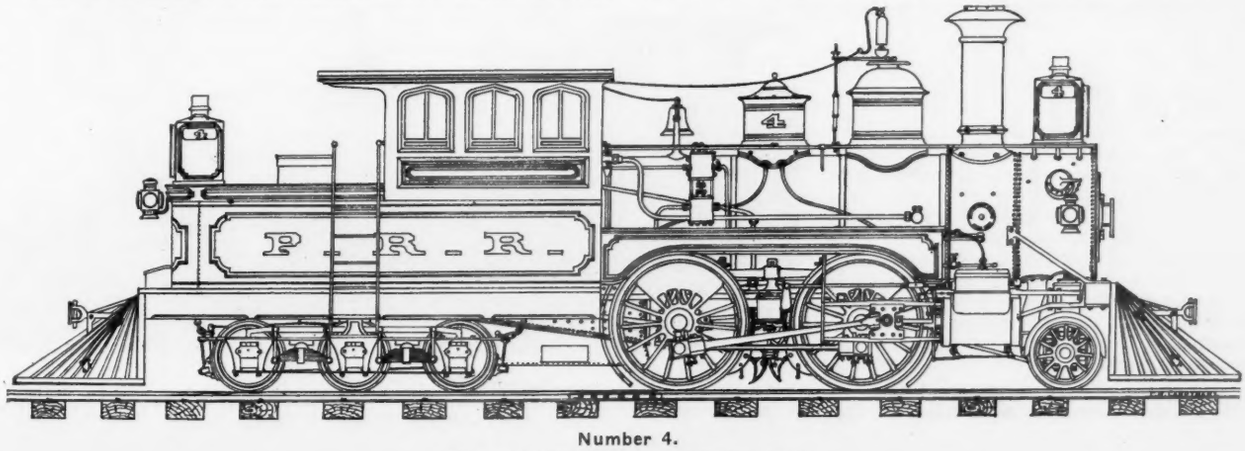
The peculiar conditions attending the use of a locomotive in Pittsburg, Pa., to haul freight trains from the Duquesne freight station at the "Point," or intersection of the Monongahela and Allegheny rivers, to the beginning of the elevated track at the Union Station, a distance of over one mile along Liberty street, one of the busiest thoroughfares in that or any other city, led Mr. Colin in 1874 to prepare an engine especially for this service. In conformity to an ordinance of the city, coke must be used as fuel; steam must be prevented, as far as possible, from blowing off; and the speed must not exceed four miles per hour. The rails were of a pattern which enabled vehicles to traverse or leave them with ease, but were not so well adapted to the performance of the locomotive, and were often covered with a black, greasy mud which rendered it difficult to obtain adhesion, or prevent slipping and its consequent annoyance to the business men in their offices, or frightening horses on the street.

To overcome some of these difficulties, of this street service, engine 258, a sister engine to 256, was selected. Its tender was dispensed with, and instead a coal-bunker was built on an extension of the frame at the rear end, and a large saddle-tank covered the boiler between the cab and the smoke-arch. A pipe was attached to the top of the Baldwin "exhaust-pot," as the peculiar nozzles of these engines were called, and carried out through the left side of the smoke-arch and thence into the water-tank at its top. This device was so arranged that the exhaust could either be turned into the pipe leading to the tank or into the stack in the usual manner, as desired, by means of a reach-rod and shaft, the latter entering the smoke-arch on the right side. Mufflers had not yet come into use on safety-valves, so the 258 was provided with a pipe extending from the back boiler-head into the water tank, and fitted with a globe valve which could be opened when the engine approached the blowing-off point, allowing the steam to pass into the tank. Otherwise no changes were made in the engine except that the designer supposed its maximum weight of 94,300 lbs. would give it such an amount of adhesion that sandboxes would be unnecessary and therefore omitted them, but this idea was found to be incorrect, and the engine was then supplied with these very necessary fixtures. No means for escape of any surplus exhaust steam from the tank was provided except through a safety-valve on its top. This, however, proved inefficient, and when working



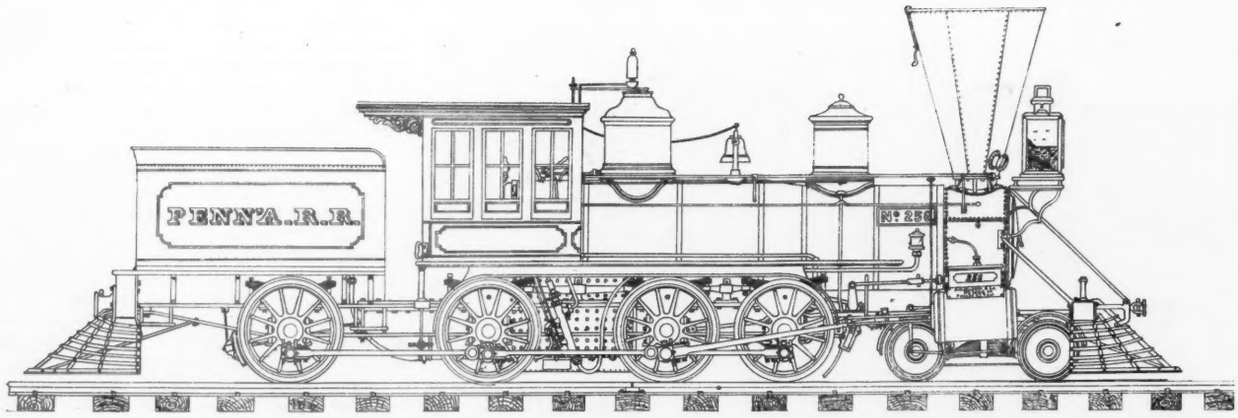
First Hose Coupler Used on Westinghouse Airbrake, P. R. R., 1869-1873

Close spaced diagonal lines on one-half of coupling. Wide spaced on other half of coupling.



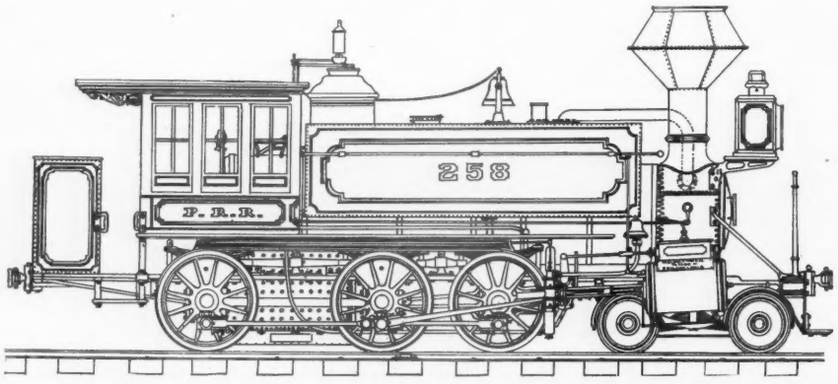
Number 4.

Built at Altoona, 1881, for suburban traffic.



Number 256—Tender on Extension of Engine Frame with Drivers Underneath, 1865.

with the exhaust turned into the tank, the engine was enveloped in a cloud of steam which escaped through the imperfect riveting of the seams, and around the joint of the cover, or manhole. An injector on one side and a pump on the other constituted the "water-works," but the high temperature imparted to the water rendered the former almost useless, and sometimes interfered with the favorable working of the pump. The conditions of the street, even with sanded rails, caused so much slipping that the coke fire languished and steam went down unless the exhaust was used



Number 258.

Arranged to condense exhaust when used in city streets, 1874.

direct. The experiment, so far as this street service in Pittsburg was concerned, proved a failure, and the engine was taken to eastern yards, where the requirements were less exacting. It continued in service for several years without impressing the Mogul Power Department with the desirability of perpetuating the type in later engines.

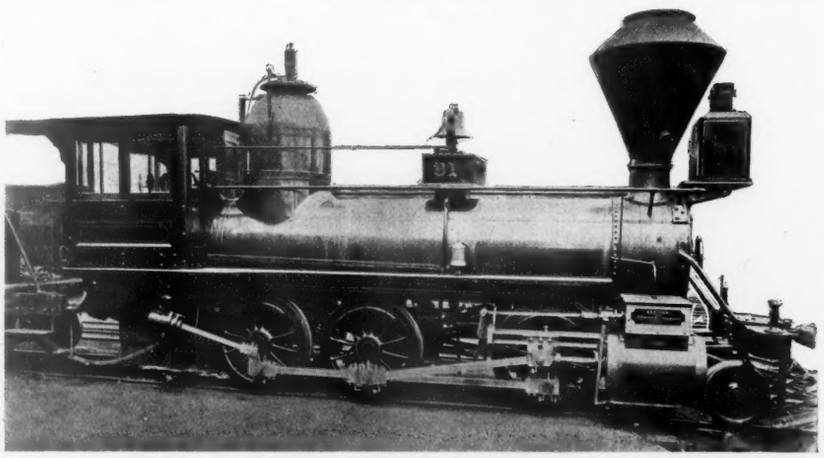
Probably the only other experiments which were confined to the first engines in each case built to carry out the ideas of the designers, were five in number. The first of these was "high speed" passenger engine No. 2, built at Altoona in 1880. It weighed 90,800 lbs.; had 19 in. x 24 in. cylinders; 68 in. drivers and a firebox 119 in. long and 39 in. wide, inside. Alligator guides, driving-boxes of gun-metal without wedges, slab frames from the rear of the front driving-box knees to the transverse frame behind the firebox, and the boiler center at slightly higher elevation than was then followed on most American engines, were distinguishing features of No. 2. Otherwise it bore a very close resemblance to the 62 in. and 68 in. "C," and "CA," anthracite engines, at that time hauling the express trains on the New York division. No. 2 was known as Class K, although it differed greatly from the magnificent 78 in. wheel engines of that class which came out one year later and rendered such excellent service until within the last seven years. It was soon found to be overcylindered, and the diameter was reduced by bushings to 17 in. The engine was taken off the road in 1898.

The second of these experiments was No. 4, a double ender built at Altoona in 1881 for suburban traffic. Its weight was 124,100 lbs.; cylinders, 17 in. x 24 in.; drivers (four in number), 62 in.; dia., and firebox, 35½ in. x 86 in. The drivers were between the cylinders and firebox; a truck with a single pair of wheels, and framing as on consolidation engines, was in front of the cylinders, and a six-wheel Bissell truck was behind the firebox, under the rear part of the engine frame, which carried the tender. This tender was of the wing type, with its wings on each side of the firebox, and the cab was placed on the top, giving the engine somewhat the appearance of having been telescoped in a wreck. Access to the cab could only be had by climbing vertical steel ladders attached to the sides of the water cistern. The boiler was of "Altoona" type with sloping crown and roof sheets, and the dome was on the first ring of the barrel, close to the stack. The English reversing screw was used instead of a lever. No. 4 ran on local trains until 1891, when it was taken to Altoona, where it stood in the shop yard for about one year, after which it was scrapped.

In 1889 the "Pennsylvania," No. 1320, a Webb compound built in Manchester, England, by Beyer, Peacock & Co., on exactly the lines of the standard compound express locomotives of the London & North-Western Railway of England, was placed on the road, and after trials on the various divisions was finally put in service regularly on the New York division, where it remained until 1897, when it was cut up.

This English compound had the Joy valve gear. The driving-wheels were 75 in. in diameter, without parallel rods, and the high pressure cylinders were 14 in. x 24 in., exhausting into the single low-pressure cylinder 30 in. x 20 in. The greatest trouble experienced with it arose from difficulty in starting quickly owing to only the rear pair of drivers being available until a sufficient amount of exhaust steam had accumulated to act upon the low-pressure cylinder which actuated the forward pair.

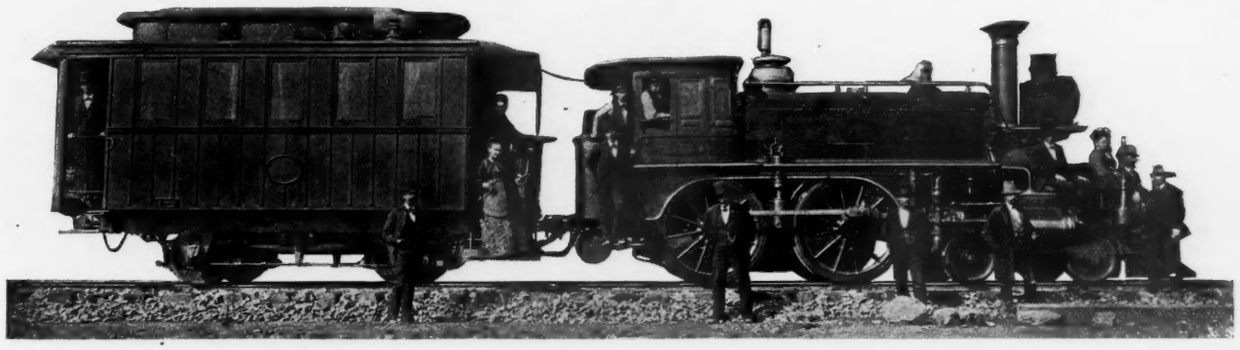
In 1901 a compound engine was built at Altoona for passenger



Number 91 (Originally Logan).

A rebuilt Ross Winans "camel." Dome, throttle and relief valves and their springs are original. Exploded its boiler in 1876.

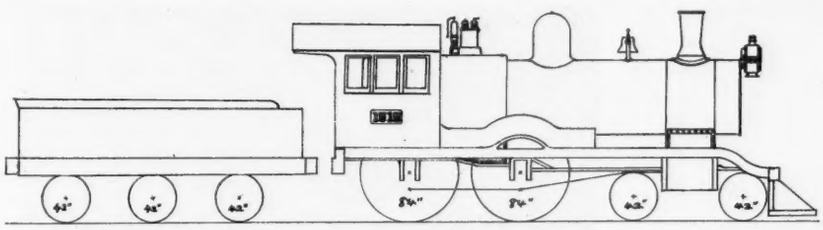
service and after a trial of several months on the mountain, it was taken to the New York division and thereafter ran the Pennsylvania Limited between Jersey City and Philadelphia until 1904, when it was taken off the road and utilized to furnish power to steam pumps on the Meadows. Like most of the compounds, it made considerable shop time during its service on the Limited. A striking comment on its work when running was the reply made to the writer by an official of the company a few years ago. The Limited had side-wiped the engine of a work train whose crew, through some blunder, had puled out of a siding at the time it was due to pass, and as a result both engines were overturned. Supposing, of course, that 1515 was drawing the Limited at the time. I asked where it had been taken, and was informed that it had been in the shop on the day of the accident, and that if it had been running there would have been no collision, as it would certainly have been behind time sufficiently, at least, to have allowed the other engine to have got out of its way!



Number 251 with Private Car Used by Superintendent of Pittsburg Division Until 1877.

Built at Altoona, 1864, and was at that time rigidly attached to an extension of the frame of No. 217. At that time it had a standard passenger car truck under it at the point where the double washer appears, near rear platform. It gave trouble on curves, and was afterwards placed on a standard cabin car truck, as shown.

This engine had a high pressure cylinder of 19½ in. diameter, and a low pressure of 31 in. The stroke was 28 in.; diameter of drivers, 84 in.; total weight, 145,500 lbs.; piston valves on sides of cylinders under smoke-arch and directly connected to the links. The finish was strictly English, even to the wheel covers, and the tender was of six-wheel type. No. 1515 was not the first Pennsylvania engine to use piston valves, one of a peculiar design having been tried on a Baldwin freight engine in the early '80s. As the old cylinders were retained, the inventor made a special steam-chest somewhat wider and deeper than that used with the slide-valve.



Number 1515, Compound, Altoona, 1892.

This special chest contained three cylindrical divisions side by side lengthwise, and these divisions contained three piston valves, the stems of which were connected on the outside of their glands to a cross-bar attached to the regular valve-rod. The exhaust nozzles were fitted with check-valves to enable the engine to be reversed without drawing cinders into the valves and causing injury. This latter feature was found to be objectionable, and the inventor fearing trouble from cinders entering the valves if the checks were not retained, only continued his experiments for a short time. The valves, I believe, gave fair satisfaction. These two engines and several Baldwin compounds comprised the only piston valves used on the main line until 1904. Since that time they have been introduced in considerable numbers, both on freight and passenger engines of several classes. Whether intentionally or only by a coincidence, their use now appears to be entirely in connection with the Walschaert link.

In 1900 an experiment was made with three new passenger engines which was not repeated, and after three years' service these engines were transferred to the Long Island Railroad, probably from a similar motive to that which actuated a good old sister of the Methodist Church in the days when that denomination opposed the wearing of jewelry. In an experience meeting this sister is said to have told how she had indulged in these forbidden things, but finding they were leading her to the Evil One, gave them to her younger sister and had since given them no consideration! These three engines had boilers of the Wootten type and, of course, had the cabs set well forward on the boiler. The frames, running gears, etc., were of Atlantic type, and practically the same as the later class E engines, except that the trailing wheels were 56 in. in diameter instead of 50 in., and were considerably closer to the rear drivers. The cylinders were 20½ in. x 28 in., and the driving-wheels were 80 in. in diameter. The weight in running order was 173,450 lbs. The tenders were of water-bottom, six-wheel type, and strictly English in every outline.

Other types of compound engines beside the 1320 and 1515 were tried at various times between 1889 and 1902, but all were afterward either sold or changed to simple engines. Some were of two-cylinder type, and several were of the Vauclain four-cylinder type.

The de Glehn four-cylinder compound Atlantic engine No. 2512, built at Belfort, France, by the Société Alsasienne de Constructions Mecaniques, in 1904; followed in 1905 by two four-cylinder compounds from the Baldwin works and the American Locomotive Company, respectively, and a simple prairie type from the latter company, complete the experimental engines worthy of passing mention. These four engines can scarcely be said to have yet passed the experimental stage, especially in the case of the de Glehn, which was not placed in regular service until after the close of the St. Louis Exposition. It met with a serious accident a few months later which necessitated sending to France for a number of new parts to replace those broken or seriously damaged, and this caused the engine to stand idle for several months.

Countless other inventions covering almost every part of a locomotive, have been tried at various times, but generally proved so unsatisfactory that they were abandoned after very brief trials.

The most radical change is the recent application of the Walschaert link to several hundred locomotives to both passenger and freight service, and from its special adaptability to the classes of engines using it, and the satisfaction of both officials and employees with its mechanical features and its performance, it is likely to be the standard for at least all engines except perhaps the old eight-wheel type, and is especially adapted to any type requiring curved eccentric rods or intermediate connecting-bars if the Stephenson link were used.

The Telegraph Block System in England.

Readers who are weighing the relative merits of the telegraph block system as compared with the controlled manual or the automatic, will be interested in the following succinct description, by Mr. Henry Johnson, of the most common English practice.

On most English railroads other than single-track lines block signaling is carried out by what is known as the block telegraph. Specially designed block signaling instruments are provided in the signal cabins. In case of a double track Signalman B. has an instrument for working to and from A and another instrument for working to and from C. Each instrument consists essentially of the following, viz.: In cabin B, for instance, for operations between A and B: 1. A visual indicator showing the state of the block section from B to A. 2. A visual indicator repeating the position of the indicator at A which shows the state of the other track from A to B. 3. An electric switch for operating the indicator at A. 4. A single stroke bell for receiving code bell signals which must

accompany all changes in the visual block indicators and must be acknowledged. 5. A bell key for operating the block bell at A.

An exactly similar set is used for block working between B and C, and each part is distinctly labeled to show to which section it applies, and in which direction. There are about ten designs of block telegraph, some requiring three wires and some only one; but they all conform to the above named essentials. The wires are grounded at the cabin except in neighborhoods of electric traction.

The usual form of blocking is the "affirmative," the block indicator working to three positions, viz.: 1. "Line Closed." 2. "Line Clear." 3. "Line Blocked." With this arrangement Signalman B, never sends a train forward to C without first asking C to accept the train. But with some of the short headway in suburban traffic the "positive" method is employed, when the block indicators work to only two positions, viz.: "Line blocked" and "line clear." The "line closed" position is left out to save time, and Signalman B sends train forward without preliminary question, depending on the assurance of line-clear which was received from C after the passage of the last preceding train. He has this assurance not only from his block record sheet, as would be the case in telegraph block signaling in America, but also from his visual indicator, which indicates "line clear," and has continually so indicated since the arrival of the last preceding train at C. Considerable importance is with good cause attached to the visual indicator portion of the block instrument.

A small portion only of the railroad systems in Great Britain and Ireland use what is known as the "lock and block" or "controlled manual" system of blocking, and nearly all of these are of the Sykes design. This has for many years included the locking of the facing points on a route after the home signal has been placed in the proceed position and until the engine has reached a treadle in advance. Electrical junction locking is also largely applied in this system and trailing points are locked by the act of accepting a train (plunging) from the operator in the rear. Experiments were tried in track circuits by Sykes as early as 1870 on the Chatham & Dover Railway. He applied that system at the Crystal Palace Station about the year 1876, using one cell of Daniel battery and a one ohm relay. Track circuiting was, however, abandoned for many years owing to the then impossible task of persuading the various railroad companies to bond the wheels of their cars. Wheels with wooden centers were and are still the standard.

All passenger single-track lines other than those worked by one engine only are operated on either the staff or the tablet systems. The operation of a single-track railroad on the "controlled manual" system, or "lock and block," has often been proposed in the United Kingdom, but has met with absolutely no support.

Foreign Railroad Notes.

The Prussian railroad estimates call for provision for an addition of 10,583 to the regular force of employees.

Railroad construction has continued in Russia in spite of its troubles, and in the first half of 1906, 1,020 miles of new road were opened.

The Bavarian government is making a survey of the available water powers in the country, with a view to utilizing them for generating electricity for working the state railroads.

The Ricken tunnel in eastern Switzerland, which will be very nearly five miles long, had been excavated for seven-eighths of its length at the end of 1906. Coal has been met in the tunnel, but not enough to be worth working.

On the 28,617 miles of railroad in British India in 1905, 452,058 men were employed, an average of 15.8 per mile of railroad. Of this army of employees only 6,535 were Europeans; but there were 9,175 of mixed blood—Eurasians, so called.

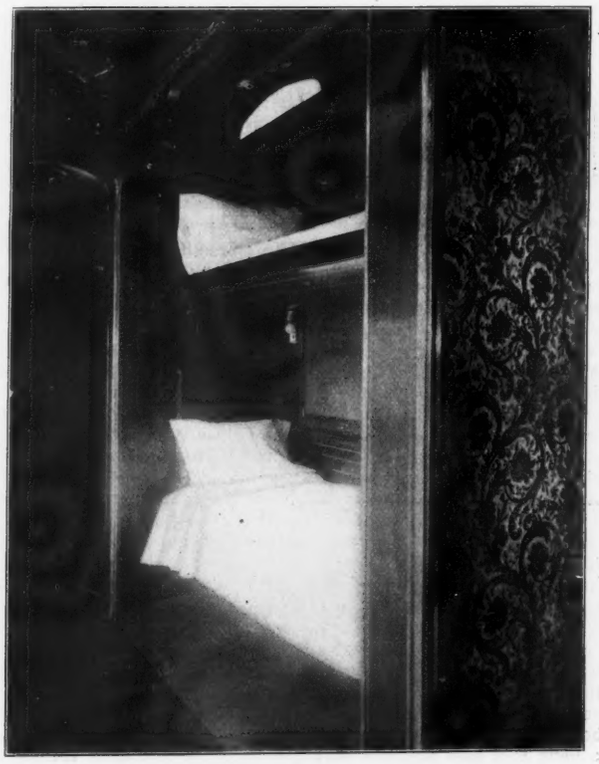
The freight blockade in Hungary called out a discussion in Parliament, during which the responsible Minister said that it was first of all due to an unforeseen sudden increase of 22 per cent. in freight shipments, next to extraordinary snowfalls, and finally to prevailing illness which disabled an unusually large number of enginemen. The station yards are not sufficient for the traffic, and the rolling stock, though unusually large additions have been made, is also insufficient. Altogether, the story fits Dakota about as well as Hungary.

Sleeping Cars on Illinois Traction Lines.

The Holland sleeping car for electric railroads was described in this paper at the time that the first two cars were being built (*Railroad Gazette*, Aug. 14, 1903), and the statement was made that they would be operated over certain of the traction lines between Indianapolis and Ohio points. They were in this service for a time, but later were withdrawn, and last fall the two cars, with all the Holland Sleeping Car Co.'s patent rights for America, were acquired by the Walter A. Zelnicker Supply Company, St. Louis, Mo. The two sleeping cars were later sold to the Illinois Traction System, and were taken into their shops at Bloomington for a complete overhauling and refitting. They were placed in service on the first of this month between Bloomington and St. Louis, via Decatur and Springfield. In exterior appearance they are like the usual large interurban electric car. The interior, however, is novel, as appears from the views shown herewith.

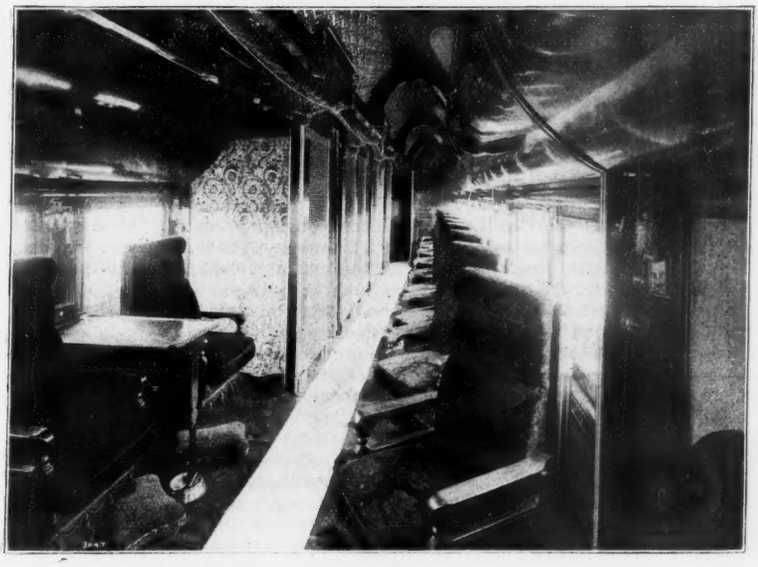
Interior of Holland Car for Day Travel.

To give again, briefly, the scheme on which this car is designed: In the day time it is used as a parlor car. The chairs are spaced alternately 3 ft. 6½ in. and 3 ft. 3½ in., the narrow



Section Made Up with Front Partition Removed.

spacing being between the chairs turned back to back when the berths are made up. To make up the berths the inner arm of each chair is dropped down to a horizontal position to fill the space between chair and car side, and the seat cushions are pulled forward, resting on supporting rods fitting in sockets in the front panel of the chair. The outside chair arms are removed completely, being used to fill the remaining space between chairs and wall, the backs are pulled down, and the head rolls dropped forward to provide pockets for clothes. The upper berth mechanism is quite similar to the Pullman arrangement, and bedding, etc., is carried in the pocket under the roof. Compartments under the chairs hold the pillows, and the blankets and linen are kept in closets at the end of the car. The completion or screening off of the compartment is accomplished by means of flexible wooden screens, made on the principle of a roll-top desk, which disappear beneath the floor in the day time. They slide in removable posts which fit in sockets in the floor and are supported at the top by the special ornamental open grille extending down from the roof of the car. A berth is large enough for a single person only, is extra long—6 ft. 8 in.—and the compartment is large enough to provide a space between berth and front screens approximately 14 in. wide, for dressing and undressing. Other facilities provided are quite as complete as in a standard Pullman.



Interior of Car with Part of Berth Made Up.

The cars are 57 ft. long over all and weigh 50 tons. They are equipped with 150 h.p. of motors. The service competes with the Chicago & Alton and the results will be watched with interest.

President Finley to His Traffic Men.

The representatives of the freight and passenger departments of the Southern Railway were addressed as follows at Atlanta on February 13 by W. W. Finley, President of the road:

Your duties bring you into personal and daily contact with the people along the lines of the Southern Railway, and I as one who has filled positions which some of you are now filling, propose to speak to you briefly of the relations of freight and passenger agents to the public. Your duties are of a two-fold nature. You owe duties to the railroad company by which you are employed and you owe duties to the public. These double duties do not in any way result in conflict or divided allegiance, for he serves the railroad best who serves the public best.

The general officers of a railroad have, unfortunately, too few opportunities for meeting and talking with the people who are dependent upon the road for transportation services. The man having business relations with the road, as a rule, comes into personal contact with the local representatives of the traffic and operating departments. The policies of the railroad are formulated and mapped out by the general officers, but the application of these policies to specific transactions must be entrusted in the main to men in the field. It follows, then, that you have in a substantial sense the reputation of the Southern Railway for fair and just dealing in your hands. Whether the company shall be popular or unpopular depends in large measure on your attitude toward the public and on your treatment of those doing business with the road. It is of supreme importance, therefore, that you, who daily come into intimate personal contact with the public, should bear in mind constantly that it is the unvarying policy of the company to be just and fair to all alike—to the small shipper and the occasional traveler as well as to the large shipper and the regular traveler; that you should be perfectly frank in all business dealings; that you should always be considerate and patient, and that you should do all in your power to make the services of the road satisfactory to those for whom they are performed.

All classes of the public should be treated with consideration and be given every possible and reasonable accommodation. Even the man who makes impossible or unreasonable demands should not be dismissed with a curt refusal. He may not know that what he asks is either impossible or unreasonable, and a few words of frank explanation pointing out to him why his wishes cannot be complied with may send him away a friend of the road instead of a faultfinder. While everything possible should be done for the accommodation of those doing business with the road, care should be exercised not to promise the impossible in the way of facilities or services. When failure to fulfil such a promise follows, the man who made it may be able to shift responsibility to the operating or some other department or officer, but the damage done to the reputation of the road cannot be easily remedied. Questions that seem to you to be trivial may be considered of much importance by the persons asking them and they should be answered with patience and courtesy.

The efficiency of the service as a whole depends on the efficiency of each individual official and employee. Every agent and employee should study his duties in detail and should understand thoroughly just what he is to do in any contingency that may arise. He should then neglect no detail of his duties, however unimportant it may seem to him, for no matter how carefully and minutely duties may be prescribed by the general officers, the neglect of some apparently minor detail may lead to serious or possibly to disastrous results. Of even more importance than a careful observance of duties prescribed by the company is obedience to law. Many of the relations between the railroads and the public are now regulated by federal and state statutes, and every official and employee of the Southern Railway must understand that its business affairs are to be conducted at all times in strict accordance with the laws of the land. No transaction or practice that is forbidden by the laws can be permitted, and there must be no evasion of any kind.

As representatives of the Southern Railway, you should bear in mind at all times the basic fact that the interests of the railroad and of those served by it are identical and that they are inseparably interwoven. The railroad can prosper only as a result of the prosperity of communities by which the demand for transportation is increased, and the prosperity of the South can continue and can be brought to the highest possible level only through adequate and efficient transportation facilities. At the present time, when every effort is being made to supply additional facilities and more efficient services, nothing is more important than that the truth of this proposition should be realized by men in all lines of business. When once this identity of interests is thoroughly understood, the railroads of the South and the people will be brought together in more harmonious co-operation for the development of the natural resources of the South and for the expansion of all lines of industry. The men in the freight and passenger departments are in a position to do much to bring about this mutual good understanding and this harmonious co-operation for the upbuilding of the territory traversed by the lines of the company. Your careful attention to the wants of the people and your considerate treatment of everyone having business with the road will serve as a constant object lesson of its interest in the individuals and communities along its lines.

My personal experience convinces me that the people as a rule are fair-minded and when fully informed can be relied on to deal justly with the transportation interests. I feel sure that it is only necessary to direct your attention to the importance of your relations to the public, and that we shall have your loyal support in carrying out what is the policy of the company—the building up of a thoroughly efficient transportation system on the solid basis of harmonious relations with the people along its lines.

There is another point to which I desire to call your especial attention. The management of the Southern Railway has been confided to us as a high and sacred trust. This trust is not confined to the President, the general officers or the Board of Directors. It applies with equal obligation, in his sphere of action, to the humblest employee as it does to the highest. Each has his duty to perform and, in the performance of that duty, he represents the railroad and is engaged in the performance of a trust in respect to it. The brakeman cannot perform the President's duty, nor can the President perform the brakeman's duty. Each must do faithfully his own duty, and only in the honest and faithful performance of duty by all can there come a proper measure of success.

The railroad and the public are entitled to the very best that is in our employees, from the highest to the lowest. They are both entitled to demand that there shall be no lukewarm or limited service, but that the heart of our employees shall be in their work. All of us have voluntarily undertaken a duty in respect to this property and the railroad and the public should receive from each of us full and faithful performance. I wish to build up among all our employees a spirit of interest and co-operation—a spirit in which each man will recognize that he is identified with the road and will earnestly and honestly work for its welfare. Only in this way can we successfully administer the trust which has been confided to us.

Privileges to Shippers and Car Shortage.*

The purpose of the Interstate Commerce Act is to place all shippers on an absolute equality. Nothing in it prevents carriers from making arrangements with shippers, so long as all terms and conditions are without undue preference or advantage to particular persons, commodities or localities. This same purpose has been the animating factor in the organization and administration of car service or demurrage bureaus. The impossibility of instituting reforms in car handling through individual initiative has never been, by the public, sufficiently appreciated. The tyranny exercised by certain powerful, grasping and unscrupulous shippers over railroads and their employees has been akin to that swayed by political bosses. "Show us favoritism or get off the earth," they say with a villain's smile, and there are too many men who desire to stay on the earth. When the general public join in a hue and cry against a demurrage bureau, they are opposing an institution that has stood for their interests and fought for equality and justice between man and man, for a generation and more.

The fact that cars travel on an average only 24 miles a day, or one mile an hour, is a vigorous and humiliating indictment of present conditions, and the people responsible for them. Justice and public interest require a clear recognition of all the facts. That there is wastefulness of transportation facilities somewhere is apparent. Let us frankly inquire where the blame rests for existing traffic conditions. Did the railroad managers fail to anticipate the enormous increase in traffic of the past few years and make the necessary extraordinary preparations to handle it satisfactory? Candidly, I think they did. Now with this open confession, which is good for the soul, let me do a little more confessing for the shippers. Before the Interstate Commerce Commission a few weeks ago I testified as to conditions as I found them. They were summarized under the following eight headings:

(1) *Shipper's Deficiencies.*

(*a*) Loading too many goods that are not sold.
(*b*) Ordering more cars than are currently needed.
(*c*) Assembling shipments in cars.

(2) *Carriers' Deficiencies.*

(*a*) Insufficient supervision of transportation and switching.†
(*b*) Holding empties for prospective loading.
(*c*) Light loading and setting out of merchandise cars.
(*d*) Unnecessary delay in unloading company material.
(*e*) Inadequate facilities.†
†(*a*) and (*e*) are not true of all roads.

(3) *Middlemen's Deficiencies.*

(*a*) Buying or handling shipments consigned to themselves.
(*b*) Holding cars to the limit while seeking customers and price.
(*c*) Reconsigning once or oftener.

(4) *Receiver's Deficiencies.*

(*a*) Primitive unloading appliances.
(*b*) Inadequate storage facilities.
(*c*) Failure to use available storage facilities.

(5) *Results of these Deficiencies.*

(*a*) Congestion at shipping point, en route and at destination.
(*b*) Industries and consumers are improvident, living from hand to mouth.
(*c*) From 100 to 500 per cent. more switching than necessary.

(6) *Pertinent Facts.*

(*a*) Railroads transport shipments faster than their customers unload them.

(*b*) Many industries and manufacturers have increased their business from two to five times in the last five years, but have not increased their facilities for storage and handling from 200 to 500 per cent.—in many instances not at all.

(*c*) Public storage is scarce; next to none for bulky commodities such as coal, lumber, etc.

(*d*) "Hold" cars and not current business burden terminals.

(*e*) When terminals are full there must be "set outs" elsewhere.

(*f*) Numerous reconsignments en route are time killers and speculators' devices.

(*g*) Railroads are not allowed to be exclusively transportation companies; the shipper with no warehouse assembles his shipment in a car; the middleman with no warehouse, sends the car first to convenient track for inspection, second to "hold" track while he negotiates sale or decides as to disposition, and third to his customer's track or to public delivery, while the customer, with no warehouse, utilizes the contents direct from car often requiring several switchings before it is finally spotted. To say that the receiver unloaded that car within 48 hours after it was placed for unloading is to leave out a large part of the story. The "why" it did not "get there" sooner was because the instructions were so transmitted and the transaction so complicated that it required at least 300 per cent. more switching than if the car had on arrival gone direct to unloading track.

(7) *General Remedy.*

Do business on the European hotel plan—order what you want and pay for what you get.

Let any act of shipper, middleman or receiver which prevents the continuous carriage of a car from shipping point to the point of unloading, be adequately charged for; then industries doing a 10-car business on a 2-car space will enlarge their tracks to avoid paying for the extra switching; then the middleman will find his customer before the goods are shipped to avoid charges for reconsignment; then the shipper will stop loading in anticipation of sales, as the process might prove expensive; then demurrage, when made high enough, will be avoided instead of absorbed and the surplus switching engines—of which there would be many—could then be converted into regular road freight hauling power.

This remedy contemplates immediate relief, leaving the question of more railroads, more cars, more locomotives, etc., to be solved in due time.

(8) *Specific Remedies.*

(*a*) Apply a reconsignment charge of $5.00 a car.
(*b*) Increase the demurrage rate to $3.00 a day.
(*c*) Increase minimums to insure full loading of cars.
(*d*) Make a through car (by car for car exchange or otherwise) and minimize transferring.
(*e*) Assess demurrage against departments on company material.
(*f*) Fix a unit of efficiency and measure railroads accordingly.

The argument is often heard that it is just as much to the public's interest to load and unload cars promptly as for the railroads to furnish and handle them promptly, since they both suffer through unnecessary delays. I concede this to be true as a communistic proposition but not as an individualistic. The interests of the public, as a whole, and of the railroads, as a whole, are subordinated to the selfish interests of the individuals comprising such "wholes." The natural incentives of the individual railroads happen to be the same on this question as the natural incentives of the railroads as a whole, namely, to furnish as many cars as possible and carry them to destination as quickly as possible, since the more cars, the more trips, the more revenue, but this similarity of interests does not hold when applied to the shipper's side, since the selfish interest of the individual shipper is to load and unload cars when it best suits his individual convenience.

A great deal has been said recently about shortage of equipment, without, however, any definition of the word "short" or contemplation of the possible conditions should the "shorts" become long. Car shortages are of two kinds, nominal and actual; nominal when shippers order more cars than they need, and actual when they need more cars than they get. The congestions at San Francisco and regions round about after the earthquake and fire were the result of too many cars being shipped to one point at one time, and while a calamity called forth the cars, the cars produced a second calamity from which the whole Northwest has suffered, for, had these cars moved regularly and normally, they would have been in service eastbound lumber-laden, instead of standing weeks within 100 miles of their westward destination. You may say that such a situation is not likely to occur again. I answer that a market quotation or a bountiful crop are sufficient to produce a San Francisco or a Galveston congestion at any time, provided cars are available in sufficient quantities to be blown with every gust of the commercial winds, and the public do not promptly unload them. It required an enormous increase in the demurrage rate to force public co-operation in lifting San Francisco's congestion, and if this demurrage panacea were rigidly applied to lake ports, the blood or cars in the veins and arteries of our transportation body would freely circulate instead of clogging and causing car shortages.

*A paper read on Jan. 11 before the Iowa Railway Club by Ashley J. Elliott, Manager of the Illinois and Iowa Car Service Association.

There is in Frankfort-on-Main a society which takes note of measures for the comfort and advantage of workmen. This society has recently published a statement of the number of the different kinds of drinks supplied to workmen on their order in 21 different establishments, some of them government and some of them private, in 1902 and 1905, which has been a time of special effort to encourage temperance among railroad men. When we see that in that time there is an increase of 26 per cent. in the number of cups of coffee, 42 per cent. in the glasses of milk and of 483 per cent. in the portions of mineral water, we feel inclined to call upon the W. C. T. U. to sound a pæan; but finding further on that the orders for beer increased 254 per cent., we are not so jubilant. It is, however, gratifying to see that in both years the orders for "soft drinks" greatly exceeded those for beer, 524,472 soft drinks of all kinds having been consumed in 1902, against 70,755 beers, and in 1905, 711,336 soft drinks (chiefly coffee and milk), against 249,983 beers. In the latter years more of either coffee or milk was taken than of beer and more milk than coffee.

Final Report of the Pennsylvania Railroad Special Investigating Committee.

The following is an abstract of the final report, dated February 4, of the special committee of the board of directors of the Pennsylvania Railroad, appointed May 23, 1906, to investigate the charges brought against officers and employees during the Interstate Commerce Commission's investigation of coal and oil traffic in the spring of 1906. The preliminary report was printed in the *Railroad Gazette* of July 6, 1906. The investigation covered the following railroads: Pennsylvania Railroad; Pennsylvania Company; Philadelphia, Baltimore & Washington; Northern Central; West Jersey & Seashore; Pittsburg, Cincinnati, Chicago & St. Louis; Vandalia; Grand Rapids & Indiana; Cleveland, Akron & Columbus; Long Island; Cumberland Valley. The report follows:

The committee called for examination officers of each of the railroad companies as follows: The chief executive or other officer designated by its President, the Real Estate Agent, the Purchasing Agent, the Chief Engineer, and also in the case of the Pennsylvania Railroad, all the Vice-Presidents, the General Manager, the General Superintendent of Transportation, the General Superintendents, the General Superintendent of Motive Power, many of the Division Superintendents, the Comptroller, and many other officers. The executive officers produced copies of the by-laws and organizations, of the subsidiary companies, and explained their general systems of administration. The real estate agents explained the system of real estate purchases, the precautions taken to secure the payment of not more than fair prices, and the methods of caring for properties purchased. The officers of the Engineering Department explained the system of inviting competition, letting contracts, and supervising work under construction; and they also produced schedules of all contracts for construction, with lists of contracts awarded to other than the lowest bidder, and the explanations of such awards. The purchasing agents explained their systems of purchasing, the methods of securing competition, checking deliveries, and insuring the payment of not more than market prices. In each of the companies the system of administration is such that the interest of their shareholders has been carefully guarded.

The operation of a railroad company is a complicated and highly specialized business, for a full knowledge of which years of study and experience are needed. Criticism of railroad administration is, not infrequently, the result of misinformation and misunderstanding; and matters are often the subject of complaint which, if fully understood, would be found to be the unavoidable result of general business conditions existing at the moment.

The years between 1899 and 1907 will be memorable in the history of the Pennsylvania Railroad. In 1899 the company was confronted by a growing traffic, by inadequate receipts from transportation, and by an increased cost of operation, resulting partly from rising prices for material and supplies and from higher wages of labor, and partly from the overtaxing of the then existing facilities for the free movement of traffic. These conditions, if not controlled, would have resulted, not only in a serious reduction in net earnings, but also in a failure on the part of the company to do its full duty to the public. In order to provide adequate facilities for the free movement of traffic, and thereby to lessen the cost, and increase the efficiency, of operation, expenditures upon an unexampled scale had to be made for real estate, for additional lines, tracks, yards, and terminals, and for engines with greater tractive power, and cars of increased capacity, and the money had to be provided for so much of those expenditures as was charged to capital account.

The most important new construction has been the double-tracking of the Western Lines, finished on the Fort Wayne, and in successful progress on the Pan Handle; the extensions, both East and West, of automatic signaling; the construction of branch lines as feeders; the completion of a four-track line between New York and Pittsburg, with the exception of four three-track sections, one of 7 miles between Spruce creek and Tyrone Forge, one of 3½ miles east of Conemaugh, one of 5.5 miles from Manayunk bridge to Newton Hamilton, one of 4 miles from South Fork to Mineral Point, and also with the exception of five two-track sections, one being the Schuylkill river bridge, 0.3 of a mile in length, one being at Conestoga creek for 0.1 of a mile, one of two miles from Donohoe to George, one of two miles at Greensburg, and one of 0.5 of a mile, the Radebaugh tunnel; relieving freight lines, so that eastbound freight does not encounter any grade between the Ohio river and the Atlantic Ocean, in excess of 16 ft. to the mile, excepting a 1 per cent. grade for 24 miles from Conemaugh to Gallitzin; a double-track freight line between New York and Pittsburg, independent of the four-track line, with the exception of 96 miles between Petersburg and Marysville, and of 29 miles between Sheridan and Gallitzin, and of 47 miles between Trenton and Newark; additional lines for freight movement in and around Newark, Philadelphia, Pittsburg, Niles, Hudson to Ravenna, and Covington; the reduction and elimination of grades and curves; the widening and straightening of the lines at necessary points; the removal of grade crossings by raising or lowering highways; elevations of lines through Newark, Elizabeth, New Brunswick, Washington, Pittsburg, Latrobe, Cleveland and Chicago; the new terminals at Washington, comprising elevated lines, tunnels, and a great passenger station, built in conjunction with the Baltimore & Ohio; the construction of tunnels to prevent interference of passenger and freight movement; adequate passenger and freight stations, docks with improved machinery, classification yards, shops, water supply and coaling facilities; the construction of new steel bridges at Columbia, Havre de Grace, and Herr's Island; the substitution of stone for steel bridges, including those over the Susquehanna river at Rockville, and Shocks Mills, that over the Delaware river at Trenton, that over the Raritan river at New Brunswick, and that at Newark, and last, but not least, the tunnels and terminal construction in and near New York, giving to the system adequate terminal facilities in the heart of the metropolis, and convenient interchange of passenger and freight traffic with New England lines.

The committee has thoroughly investigated the system under which many thousand contracts have been made for maintenance of way and for new construction. The committee reports that as effective a competition was secured as is possible in work of such magnitude, carried on during a period when the facilities of the country for construction and for the production of machinery and material have been taxed to the utmost; when the demand for has exceeded the supply of labor, and when it has been difficult to find contractors of the ability and financial responsibility, and possessed of the equipment, necessary for the completion of work on a large scale within any reasonable limit of time. The committee has called before it and examined the principal engineering officers of the several lines, the several contractors who have been, and are, engaged upon the New York tunnels and terminals, and the many contractors who have done, or are doing, the greater part of the work on the Eastern Lines of the Pennsylvania Railroad. In railroad construction economy requires that the work be pushed to completion, in order that the investment made by the purchases of right of way and by payments to the contractors during the progress of the work, may as speedily as possible become income producing. Therefore, only those contractors were asked to bid whose responsibility, capacity, and possession of the essential equipment fitted them for the successful accomplishment of the work. Most of the contracts were awarded upon competition, and to the lowest of several bidders. The committee nas investigated every instance in which a contract was awarded without competition, or to other than the lowest bidder. In every such instance the award was made by the concurrent action of more than one responsible executive officer. In every instance where a contract was awarded after competition, and to other than the lowest bidder, the award was so made because the awarding officers found that the lowest bidder either did not have sufficient capital, or was without the necessary equipment, or was overburdened with other work, or was unwilling to agree to complete the contract within the necessary time. In every instance where a contract was awarded to one bidder, and without competition, the award was so made because the awarding officers, in the impartial exercise of a sound discretion, determined it to be to the interest of the railroad company to so award.

Because of charges that have been brought to the attention of the committee, alleging favoritism in the award of contracts to H. S. Kerbaugh, and to H. S. Kerbaugh, Incorporated, the committee specially scrutinized all contracts awarded to Mr. Kerbaugh or to his corporation. Almost every one of those contracts was awarded after competition, and because the Kerbaughs were found to be the lowest bidder. In the few instances where contracts were awarded to them without competition, those awards were made only for the reason that the interests of the railroad company required the completion of the work within the shortest possible time, and because no other contractor was possessed of the capacity and plant adequate to the accomplishment of the work within the necessary time. The committee has had some of the most important work done by the Kerbaugh Company, and without notice to it, re-examined in detail, by W. K. Martin, a competent engineer, new measurements being made without reference to the original plans or cross-sections and by such methods as are employed in preparing careful estimates of probable quantities on a located line, Mr. Martin having, however, the advantage of knowing the actual width of cuts made, the spans of arches built, the sizes of the drains, and other structures, and having had to conjecture only as to the depths of foundations and the weight of iron pipes. Mr. Martin checked the quantities called for by the final estimates and found that the prices paid were, on the average, lower than those paid to other contractors on the balance of the line, and were in themselves reasonable.

It is the judgment of the committee that there has been no favoritism in selection of contractors; that officers have awarded contracts in proper exercise of a reasonable discretion; that work under construction has been carefully supervised; that every reasonable precaution has been taken to insure the faithful performance of contracts; that no officer or employee, of any of the railroad companies

has been, or is now, directly, or indirectly, interested in any contract for construction, and that no officer, or employee of the railroads has directly, or indirectly, received any compensation, or gratuities, from any contractor; and that the officers of the railroad companies have been in all engineering and construction work as faithful as they were skilled.

The Purchasing department is organized under a system which prevents collusion with any seller and makes certain the payment of not more than market prices. The department neither receives nor pays out any cash. All its purchases are competitive, with the exception of those articles whose manufacture is limited, either through the seller's control of patents or because they are specialties, and the non-competitive purchases constitute a small percentage of the total purchases. The department has indexed records covering many years of past and present market prices of all material and supplies which have been, or are likely to be, bought. There is a strictly enforced regulation that "all contracts for supplies covering a term of more than three months, or involving an outlay exceeding $10,000, must be sanctioned by the Second Vice-President, and copies thereof shall be furnished to the General Manager and the Comptroller." Purchases are made only on written requisitions from the officer for whose department the purchase is made. Several officers and employees of the department participate in the making of every contract and the giving of every order. Bids are awarded on consideration of the quality of material offered, the price and delivery point, and the time of delivery; and as between bidders, otherwise equal, their disposition to favor the Pennsylvania Lines in competitive freight business. Every bill, before forwarding for voucher, is submitted to and approved by the officer on whose requisition the purchase is made and by several officers and employees of the Purchasing department. In the Comptroller's department, as preliminary to the issue of a voucher, the calculations on the bill are examined and verified; its total is checked with the contract or order, its terms charged to the several accounts affected, and all payments made by voucher.

Because of charges brought to the attention of the committee the relations of the Standard Supply & Equipment Co. to the Purchasing department have been fully investigated. Mr. Winthrop Sargent, who has successively held the offices of Secretary, President and chairman of the board of that company, was formerly an employee of the railroad in its Motive Power department, but has had no connection with the service of the railroad since July 15, 1886. That company is capitalized at $400,000; has warehouses in Pittsburg, Altoona, Philadelphia and Baltimore; has made sales since January, 1900, amounting yearly to more than $1,750,000, of which about 5 per cent. were sales to the Pennsylvania Railroad and its eastern lines, and about 2½ per cent to the western lines, the remaining 92½ per cent. being sales to other railroads or to other concerns. Six officers of the Pennsylvania System were at various times owners in all of less than 150 shares of the 4,000 shares of the Standard Company's stock purchased for cash at par. All purchases from that company are made on a competitive basis.

It is due to the Purchasing department to say that the committee is satisfied, after full investigation, that that department has been administered with marked ability and with unswerving fidelity to the interests of the shareholders of the Pennsylvania Railroad.

Notwithstanding large and costly increases in freight car equipment, it is the fact that there are now in service on the lines of the Pennsylvania Railroad fewer of its own freight cars than there were some years ago, because under modern transportation conditions freight cars are subject to loading for movement to points upon other lines; because of the inadequacy of the stipulated per diem compensation for the use by roads of cars owned by other roads; because of the inefficiency of the penalty for unreasonable detention of such cars by roads not owning the cars; and because of unreasonable delays by consignees in unloading cars. Within a short time some of the trunk lines have agreed to a moderate increase of that per diem rate, but other railroads have not as yet assented to that modified agreement. Many railroads have not provided themselves with an adequate equipment, because it is cheaper for them to use, in some cases under the rules and in other cases in defiance of the rules, the cars built and paid for by other railroads rather than to build, pay for and use cars of their own.

The construction of additional lines and the increased number and size of the locomotives have made gravely important the subject of an economical supply of water of a quality suited to engine use and adequate for both the present and the future. On the Lines West, the water stations have been changed and enlarged, and it has become necessary to use water softening processes and to build stations therefor at Washington, Middlepoint, Indianapolis, Hartsdale, Richmond, Bradford and Unionville. On the Lines East there have been in the past periods of drouth when it was necessary to haul water in large quantities and for long distances, and at all times the supply has been costly and insufficient. To meet and overcome this difficulty, this company has, in the manner and to the extent authorized by the laws applicable to it, promoted the organization of water companies at various points along its lines, and has made advances to such companies of the amounts necessary to enable them to acquire adequate water supplies, and to erect and construct the works and to lay pipe lines necessary for the utilization and delivery of water at various points along the company's lines. It is believed that through this outlay the company will be enabled to acquire an adequate supply for the present and for a long time to come, and at a cost per gallon materially lower than that heretofore paid. No director, officer or employee of the railroad company has, or ever has had, any interest, direct or indirect, in these companies.

The purchase of fuel coal for the engines and shops of a railroad company constitutes a substantial portion of its expenditures. Operating and traffic considerations are important factors in those purchases. The committee has carefully examined into the system on the different lines, of making those purchases, and reports that they have been made not only in the interest of the railroads but without intentional favoritism to any shippers. The system that has been in use on the Pennsylvania Railroad has had its advantages from the standpoint of the prices at which the purchases were made, but some disadvantages in the methods under which orders have been distributed. The committee recommends the subject for consideration as to whether any better system can be adopted.

The committee regrets that through a failure of duty on the part of some officers it was not, as soon as it ought to have been, brought to the attention of the officers charged with the duty of making purchases that the coal supplied from the tipple at Hunker's Station on the Southwest Pennsylvania division was of inferior quality. The officers who have failed in that duty have been reported for proper discipline. So soon as the matter had been brought to the attention of the Motive Power department, the building of a coal wharf at a convenient point was recommended, and when that wharf is in operation, the use of coal from Hunkers will be discontinued.

In the case of lines overburdened with traffic, and especially when the available supply of cars is inadequate, railroad officers are naturally reluctant to add to existing difficulties of movement Nevertheless, 176 sidings for bituminous mines, and 2,303 sidings for other industrial works were put in. A siding requires a construction within the railroad's right of way and a connected construction upon the property of the applicant. Every siding must either directly or indirectly be connected with or pass over a track upon which passengers and freight are moved. Where the traffic is heavy and is moved at high speed the siding must be protected by signals, which are costly, and even then the factor of danger cannot be entirely eliminated. The railroad officers must, therefore, determine in the first place whether or not the danger to life is such as to forbid the construction of a siding. If they determine that that danger is too great to be overcome by any means within reasonable limits of expenditure, they should refuse to grant the application. In the second place, the railroad officers must determine whether the probability of gain in traffic is such as to justify the construction of the siding. If they determine that there is such a probability the practice of the railroad is to approve the construction upon terms that the construction is made by the railroad at its cost, as respects so much of the siding as is within the right of way of the railroad, and at the cost of the applicant as respects so much of the siding as is without the right of way of the railroad. Where the traffic results of the siding are doubtful, it is the practice of the railroad to grant the application if the applicant consents to pay the entire cost of construction both within and without the right of way of the railroad. If the prospects of resultant traffic are reasonably good, but there is a doubt as to the continuing responsibility of the applicant, the connection is made upon terms of the applicant paying the entire cost, with an agreement on the part of the railroad to refund its proportion thereof at an agreed rate per car moved over the siding. In cases where the siding is granted, an agreement in writing is made between the railroad company and the applicant, granting a revocable license for the construction and connection of the siding under the supervision of a proper officer of the railroad company, and providing for termination upon 60 days' notice in writing, without claim for damages for such termination, and subject to the further condition that if the discontinuance of the siding be required by law the siding shall be immediately discontinued. The fact that an application for a siding has been made and refused is no evidence that the application ought to have been granted; but there must be in each instance a consideration of all the circumstances. By the Interstate Commerce Act as amended in 1906 (Section 1) it is declared to be the duty of a railroad, on application by any lateral branch line, or by any shipper tendering interstate traffic, to construct, maintain and operate on reasonable terms a switch connection or private siding, "where such connection is reasonably practicable and can be put in with safety and will furnish sufficient business to justify the construction and maintenance of the same"; and jurisdiction is given to the Interstate Commerce Commission, if the connection be refused, to

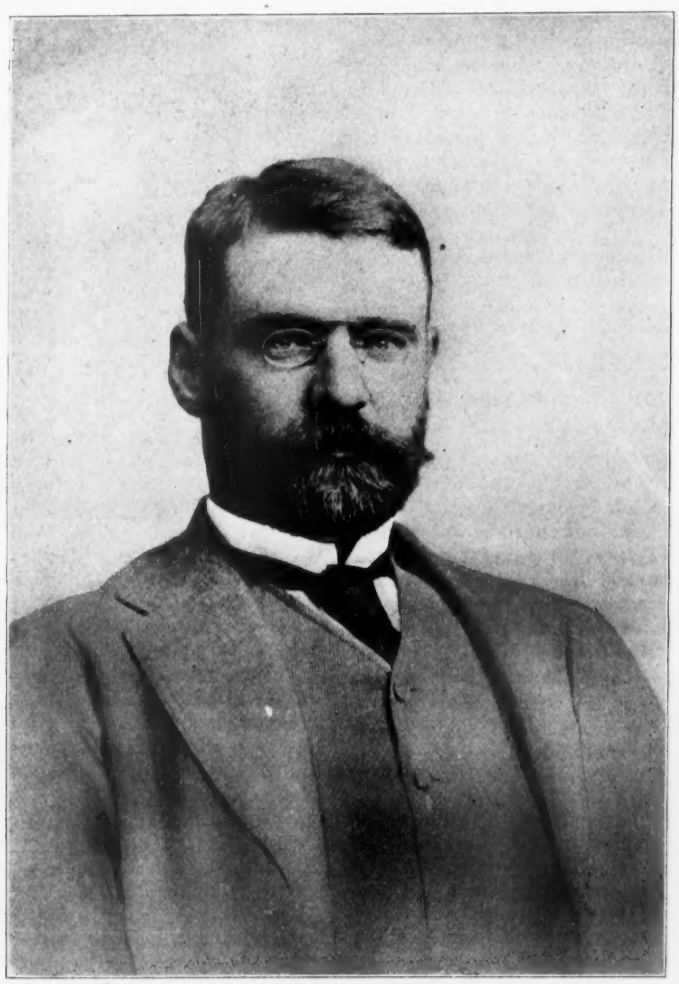
hear, investigate and determine "as to the safety and practicability thereof and justification and reasonable compensation therefor." This legislative recognition of a reasonable practicability in operation, and a business justification, as the chief elements for consideration in granting or refusing a siding, would seem to approve the railroad's established policy on this subject.

The committee said in its preliminary report, "The question of the independent, or privately owned, coal cars is not a new question, nor one which admits of an offhand solution. The Pennsylvania Railroad was chartered on the theory that the company would build the line and the shippers would furnish their own means of transportation. The greater portion of the coal tonnage of England is moved to-day in privately owned cars. The use of such cars on the Pennsylvania lines is not peculiar to a few favored shippers. They have been used from the beginning of coal transportation." There has not been, and is not, on the part of the railroad, any discrimination as between shippers in the facilities given for the exercise of that legal right. There were 5,238 individual coke cars, owned by 10 different owners, and 22,301 individual coal cars, owned by 49 different owners, in service in 1906 on the Pennsylvania Railroad, which pays for the use of the cars at the rate of six mills per mile, loaded or empty; charges the regular freight on the carload, and has the option of buying the cars at the actual cost of building cars of like character and quality at the time of the sale, less stipulated allowances for depreciation. The advantage to the owner of individual cars is that he can contract for shipments to the amount of the tonnage of his cars with an assurance of having the cars in which to ship, and this compensates him for the fact that the mileage paid him does not meet his outlay in interest, repairs and depreciation. The advantages to the railroad are that it has the use on favorable terms of cars, for whose construction it does not have to find the capital, and whose interest, repair and depreciation charges it does not have to meet, and which assure to it a greater net revenue than its own cars yield. For the reasons already stated, an equal number of railroad cars will not effectively replace the individual cars. The disadvantages to the railroad are that the shippers, having control of the loading, load their individual cars, in periods of diminished coal demand, to long distance points in order to obtain the maximum receipts from car service; and, in periods of increased coal demand, to short distance points, so as to insure their speedy return, the railroad cars allotted in pro rata distribution being at such time loaded by the shippers for foreign points, which their return is uncertain. The individual cars are also a hindrance to economical and efficient railroad operation. When empty they must be returned to their home sidings, and being moved in trains to the yard nearest to the coal regions, there must be increased switching and yard service in breaking up those trains and classifying the cars. There are also delays to trains on main lines in order to cut out cars for branch lines and sidings. There is much empty mileage in returning the cars to their home sidings. The individual cars also cause suspicions of preferences and lead to unfounded, but vexatious, charges of discrimination. The individual cars also interfere at times with the pro rata distribution, in that when the owner's sidings are filled by his individual cars, the economies of transportation require the railroad cars allotted to him to be distributed among the nearest mines, thus disturbing the pro rata distribution not only in the same region, but also as between regions. While recognizing all these disadvantages, nevertheless the railroad has not as yet seen its way clear to do away with the individual cars; in the first place because of the charter requirements above mentioned; in the second place because whenever the railroad thought that its equipment was catching up with the demands to make it possible to do so, there came a growth of business that more than absorbed its increase; in the third place, because an equal number of company cars will not, during a given period, move the same amount of tonnage and, in the fourth place, because large consumers located at points far distant from the coal fields, the successful operation of whose works are entirely dependent upon a full and regular supply of fuel, must have that supply assured to them, and this seems impossible of accomplishment, except through an assignment of cars, that can only be made certain by an ownership of cars, either by the consumer, or by the operator supplying the fuel.

(To be continued.)

Alfred Walter.

Brief reference to the life and work of Mr. Alfred Walter, late President of the Seaboard Air Line, was made in these columns last week. Mr. Walter has been characterized by a warm personal friend and associate as the last president of a great railroad in this country who was absolutely independent of financiers in his policies and viewpoints, with his interests wholly confined to the transportation problems at hand. This very aloofness from the matters which Wall street holds most important cost him the Presidency of the Lehigh Valley in 1902, as is well known. In the years prior to 1893, the old Lehigh Valley company, fathered by Asa Packer, was a sort of close corporation in the railroad field, having a line in the anthracite regions all middle, without beginning or end, and delivering its coal to other companies to haul to tidewater and to western points. As an accessory to coal mining operations, the old company prospered greatly; then it reached out to Buffalo and to tidewater at New York and became a trunk line, but without fixed policy, good financing or capable management.



Alfred Walter.

When Mr. Walter became President, in 1897, the Lehigh Valley was in what may be described as a neutral condition. It was earning money, but paid no dividends. It had thrown itself into bankruptcy by its Buffalo extension, yet Mr. Walter saw that abundant resources existed, although they had been neglected. His problem was to make use of the facilities then supposed to have been foolishly acquired and develop them so that they would become a source of profit, instead of a drag on the property; to make a trunk line successful by trunk line methods after it had failed by coal road methods. In this he accomplished his purpose, by using all the money the road earned to improve its motive power, track facilities and cars, so that it could take its place among its competitors as a first-class property, with established credit, and with the potentiality of economical operation that goes only with a well built and well equipped railroad. But in so doing, Mr. Walter ignored the demands of banking interests that dividends be paid on the stock; he saw his duty in another quarter, and in the resultant friction he was removed from office. It is fair to say that the present management of the company has adhered to Mr. Walter's betterment policy, already nearing fruition at the time of his removal, and has combined with it a plan of financing that has enabled the shareholders to receive dividends without interruption of the improvement work.

Like Thomson, Roberts, Provost, Cassatt and a long list of prominent executive officers, Mr. Walter was a graduate of the Rensselaer Polytechnic Institute at Troy. He worked his way up from supervisor to Superintendent of the Sunbury division of the Pennsylvania, and was General Superintendent of the Baltimore & Ohio lines east of the Ohio river from 1889 to 1892. When Mr. Felton left the Vice-Presidency of the Erie, where he had been in charge both of traffic and of operation, his company was at a loss to know where to go for an operating officer. Mr. Walter came to the Erie as General Manager in March, 1892, a little over a year

before the company went into the hands of a receiver, and there had his first chance to show his skill in organizing the different departments of a railroad. He improved the roadway until the Erie's tracks were brought to their present standard of excellence, and organized the transportation department in such a way that the suburban traffic could be properly taken care of without neglecting through business. Mr. Walter saw that while the commuter, *per se*, is not apt to be profitable to the company, the business he brings in his wake does pay.

It was the wish of Mr. J. B. Coxe, who died in 1894, that Mr. Walter should succeed him in the management of his coal properties. The inducement was tempting, and from 1894 to 1897 he was less concerned with the work of railroad management, for which he especially cared (although President of the Delaware, Susquehanna & Schuylkill), than with the coal business. The Lehigh Valley presidency became vacant in 1897, and Mr. Walter's work there was outlined earlier in this article, out of its chronological place, because it was desired at once to emphasize the type of railroad man he was.

The enforced retirement from this company in 1902 threw Mr. Walter into great distress. He had for some time been suffering severely from a chronic malady which he had concealed even from his wife and most intimate friends, so great was his desire to do the work at hand, without thought of self. He was a man of much culture and of simple habits of life, and was able to enjoy his travels in Europe at this period, although restless and afflicted by his disease. Returning to this country, he became Chairman of the South & Western in 1905, and President of the Seaboard Air Line in 1906. Mr. Walter was exactly the type of man the Seaboard needed. It had been starved by its financial managers and let run down hill for lack of a strong operating hand to grasp the operating problems, maintain properly out of income and build up facilities to meet traffic needs. Some progress had already been made along these lines during Mr. Walter's short tenure; much remains to be done, and the road is most unfortunate in being deprived of an executive so single-minded.

Rail Motor Car Experiments in Hungary.

The Hungarian State Railroads have been running some light suburban trains for some time with a motor car and one or two trailers. It was questioned whether a light locomotive would not be more economical, with which inferior coal and harder water could be used. Experiments were instituted over three different routes. The result was that the locomotive burned less coal for the same service and generally used less water and cost less for repairs. An absolute conclusion as to the balances of advantage and disadvantages is not yet drawn, but the authorities have ordered that seven locomotives be fitted for this work and the experiments continued.

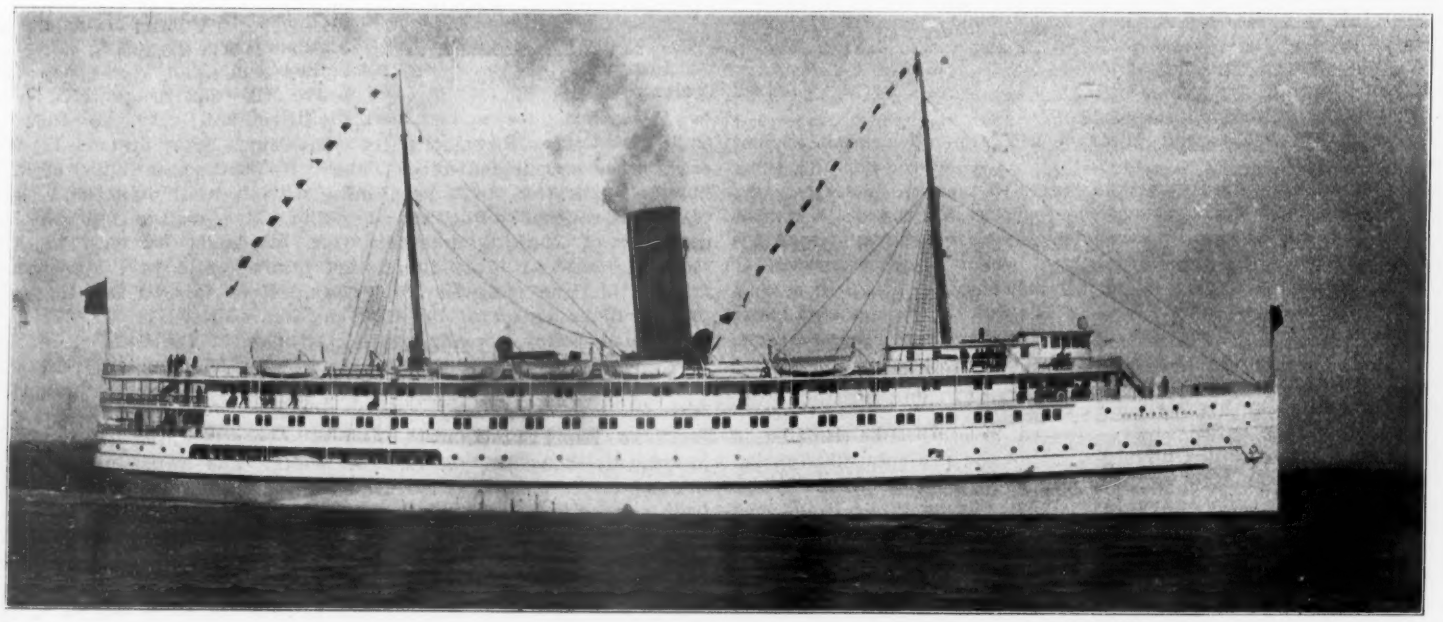
Turbine Steamship Governor Cobb.

The "Governor Cobb," the first turbine steamship launched in America, is now in service in the Eastern Steamship Company's line between Boston and St. Johns, N. B. The vessel was built by the Delaware River Iron Shipbuilding & Engine Works at Chester, Pa., and the engines by the W. & A. Fletcher Co., Hoboken, N. J. The hull is 300 ft. long over all, on the water line 290 ft. long, 51 ft. beam, 20 ft. 6 in. deep, and draws 14 ft. loaded. It is built of steel with double bottom throughout and is fitted with several watertight bulkheads. The boiler and engine pit is entirely enclosed with steel as far up as the dome deck. The vessel has state-room accommodations for about 200 passengers, and its freight capacity is 500 tons; all freight is carried on the main deck, none being stowed in the hold.

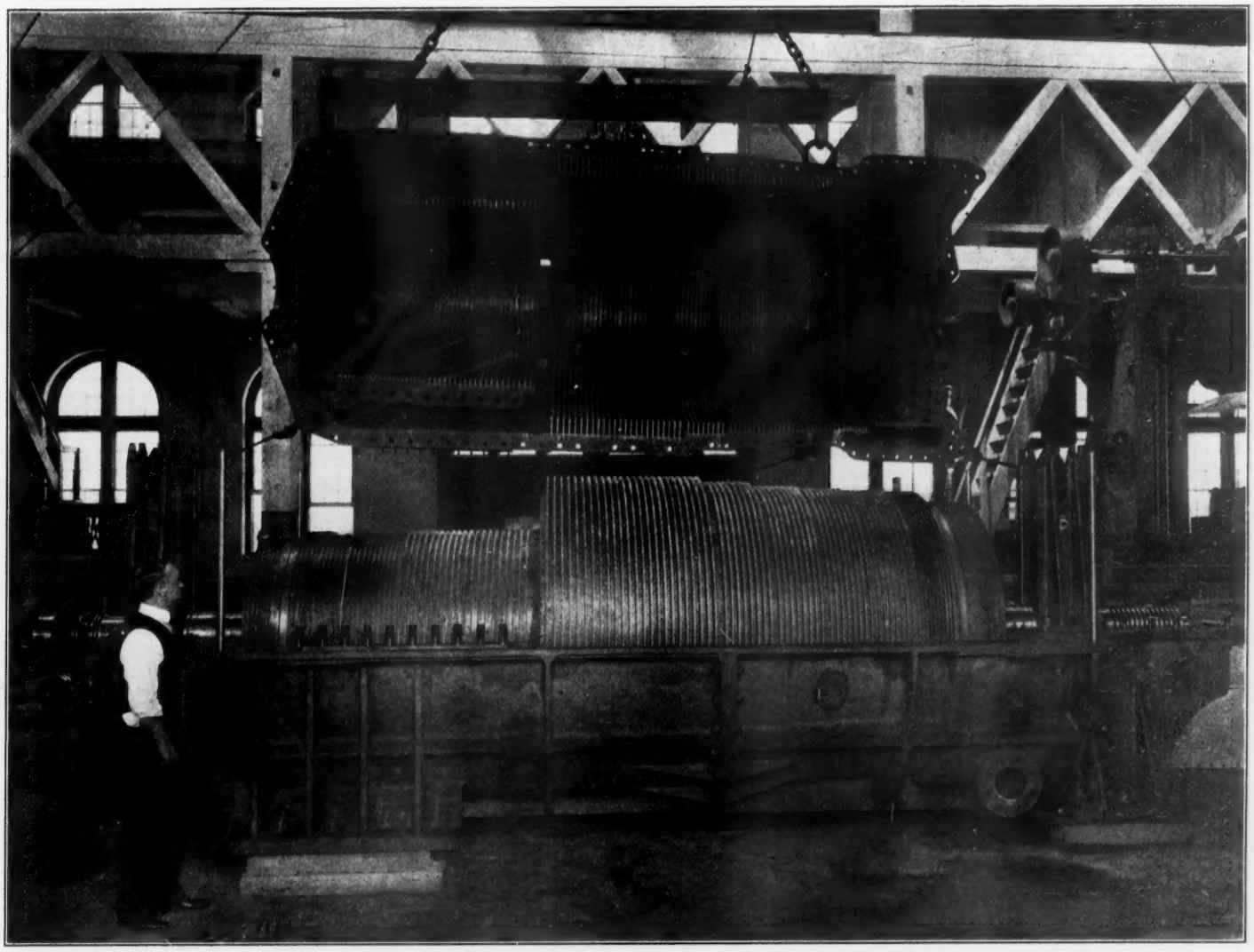
As the accompanying photographs show, the "Governor Cobb" has three screws, driven by Parsons turbines; the center one by a high-pressure turbine and the others by two low-pressure turbines. The high-pressure turbine drives ahead only, while the low-pressure engines are combination ahead and astern. A view of one of the low-pressure turbines with half of the shell removed is shown herewith. The large part of the cylinder is the ahead turbine, while the smaller part, to the left, is the astern turbine. The photograph of the engine room shows the three turbines; each low-pressure engine has a separate surface condenser, circulating pump, air pump and steam pipe connections, so that each may be operated independently.

Screw Arrangement.

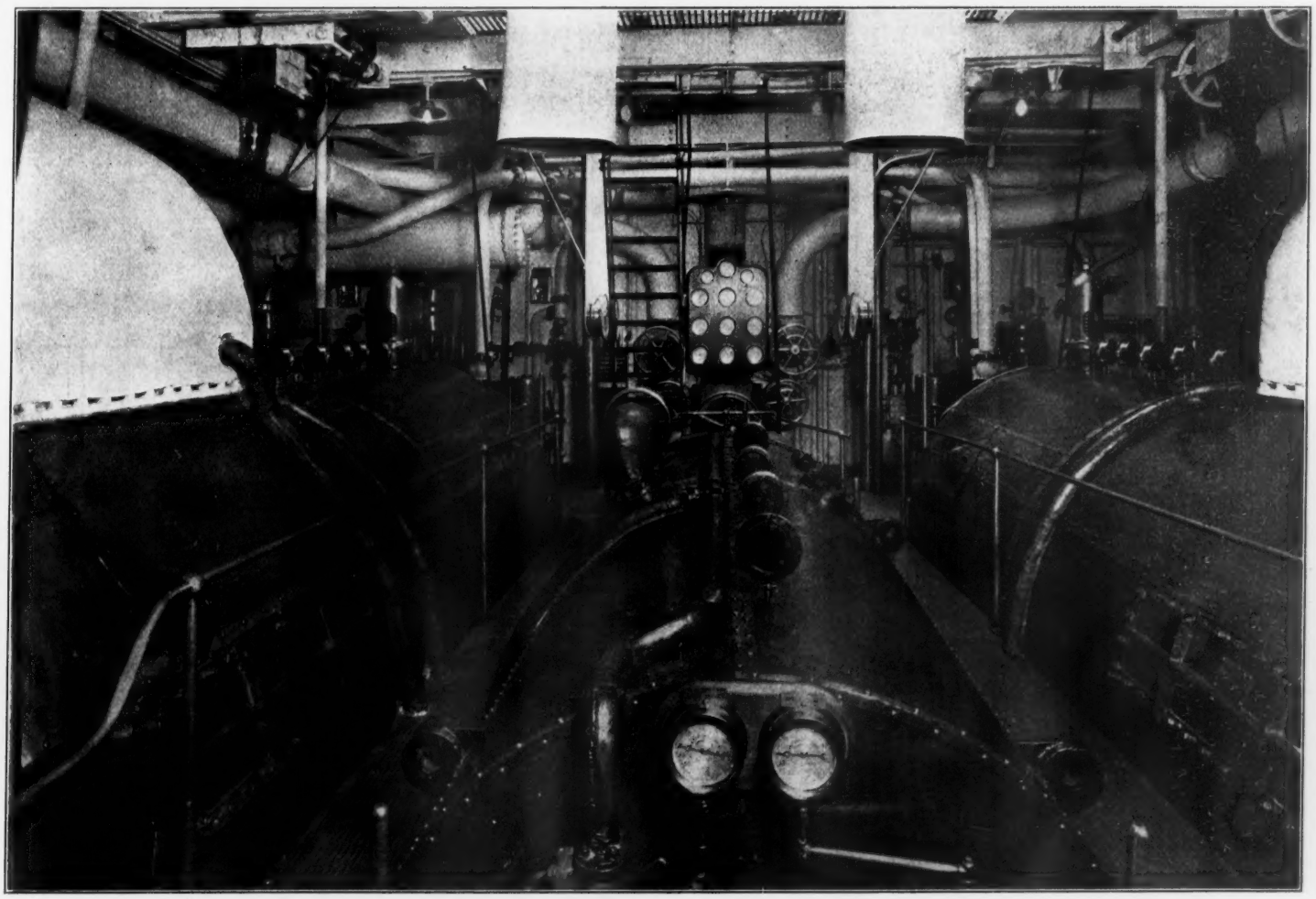
Steam is supplied from six Scotch-type boilers designed for a working steam pressure of 150 lbs. The boat is fitted with steam steering gear, as well as hand gear operated from the pilot-house and auxiliary hand gear on the saloon deck aft. The 20-k.w. generators



Turbine Steamship Governor Cobb.



Low Pressure Turbine with Half of Casing Removed.



Engine Room of Steamship Governor Cobb, Showing the Three Turbines.

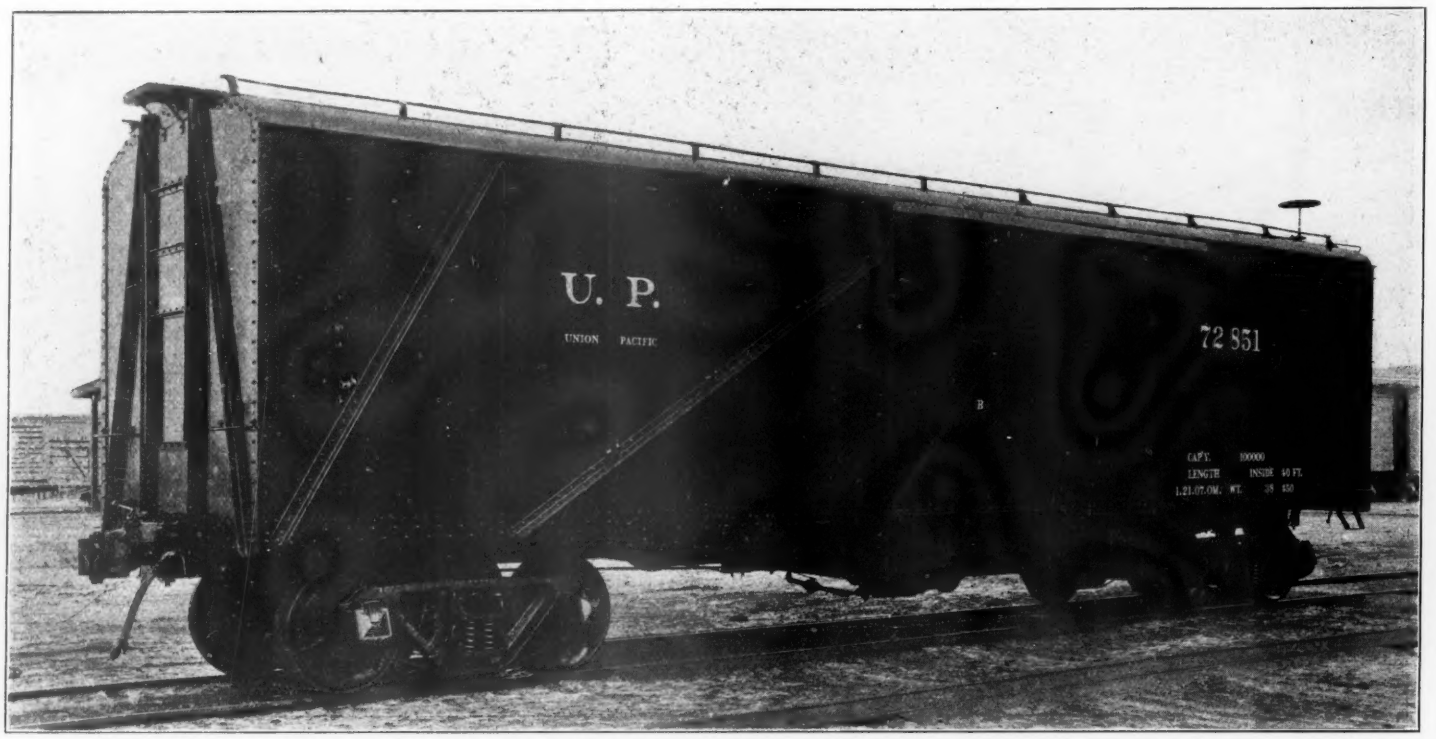
supply current for electric lights and other electric installations.

On the builders' trial trip the "Governor Cobb" developed a speed of 21¾ miles an hour over a measured mile under a steam pressure of 125 lbs., only five of the six boilers being used. On its trip to Boston it averaged over 21 miles an hour for 14 hours and 25 minutes, part of this being in the open ocean when rounding Cape Cod.

All-Steel 50-Ton Box Car for the Union Pacific.

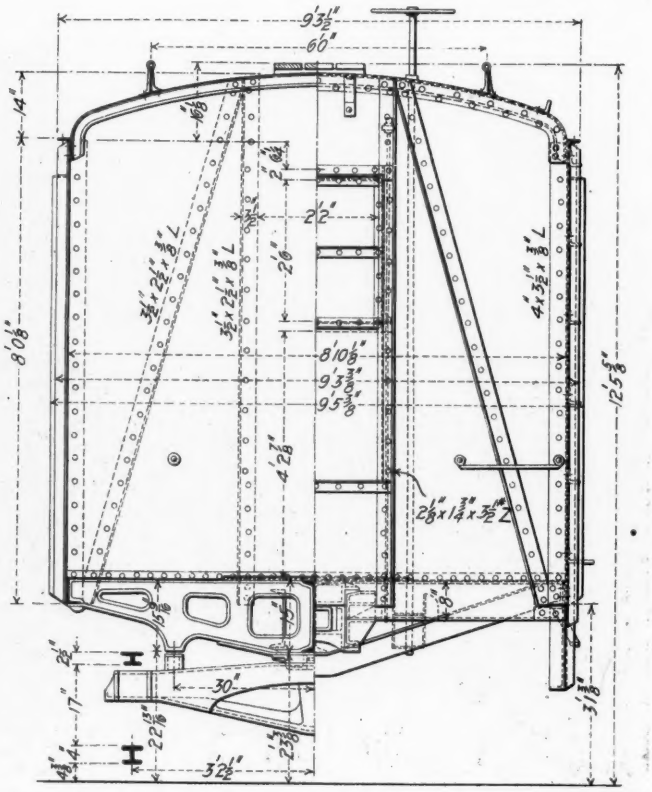
The standard all-steel postal car and day coach designs of the Harriman Lines have been described in the *Railroad Gazette*, June 22 and Oct. 5, 1906, respectively. An all-steel box car has now been designed by W. R. McKeen, Jr., Superintendent of Motive Power and Machinery of the Union Pacific, and two sample cars have been built at the Omaha shops. The first of these has been in service since the first of the year and photographs and drawings of it are presented herewith.

It is a 50-ton car, 40 ft. long inside. The principal features of the design are well shown by the drawings. Variations from wooden or composite box car design in a number of essentials will be observed. There is only one center sill—a 15-in., 42-lb. I-beam—which is cut off 17 in. beyond the center line of the bolsters. To its ends are riveted the draft sills, formed of 12-in. 20-lb. channels. There are no other separate longitudinal sills. Instead of the usual side sill a fish-belly girder construction is provided as a continuous part of the car side by extending the side sheets down to form the web member. The depth under the door opening is 22 in. Instead of the usual inter-post braces a single compression member runs from bolster to door post. It is formed of two angles, the upper one of which is made continuous over the door opening

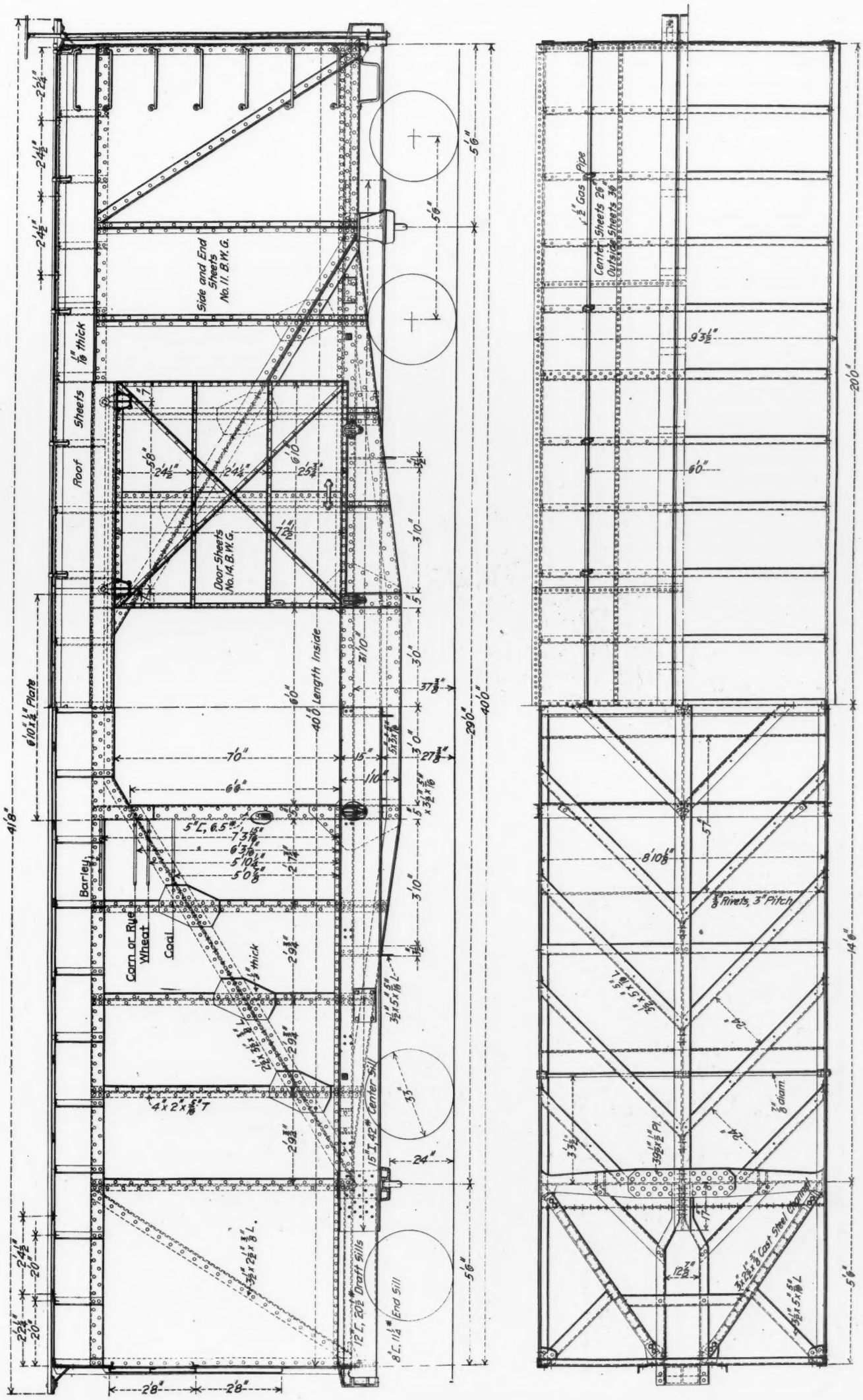


50-Ton All-Steel Standard Box Car; Union Pacific.

End View of Union Pacific Steel Box Car.



Combined Section and End Elevation; Union Pacific Box Car.


Side and End Sheets No. 11. B.W.G.
Roof Sheets 1/8" thick
Door Sheets No. 14. B.W.G.
Barley
Corn or Rye
Wheat
Coal
1/2" thick
15" I, 42# Center Sill
12" L, 20½# Draft Sills
8" L, 11½# End Sill
4"x2"x5/16" T
5" L, 6.5#
6'10½" Plate
40'0" Length Inside
2'4½"
2'2½"
5'6"
5'8"
6'10"
3'10"
5'0"
2'8"
2'9½"
2'10"
1'10"
6'6"
7'0"
Gas Pipe 2"
Center Sheets 25"
Outside Sheets 36"
9'3½"
20'0"
6'0"
8'10⅛"
5/8" Rivets, 3" Pitch
3" diam
14'6"
Plan and Side Elevation of 50-Ton Standard Steel Box Car; Union Pacific.

to provide the requisite section of metal in this portion of the structure. The side posts are 4-in. x 2-in. x 5/16-in. T bars, the corner posts 4-in. x 3½-in. x ⅜-in. angles, and the end posts 3½-in. x 2½-in. x ⅜-in. angles. The bottom transverse members are angles, of which there are five. The body bolster is cast-steel, and extending from the outer ends of the latter to the ends of the draft sills are 3-in. x 2½-in. x ⅝-in. cast-steel channels. There is a transverse tie rod ⅞ in. in diameter, 3 ft. 3½ in. back of each bolster, and further transverse stiffness is imparted by the floor angles, 3½ in. x 5 in. x 5/16 in., which run obliquely from the center sill to the sides, spaced 24 in. apart.

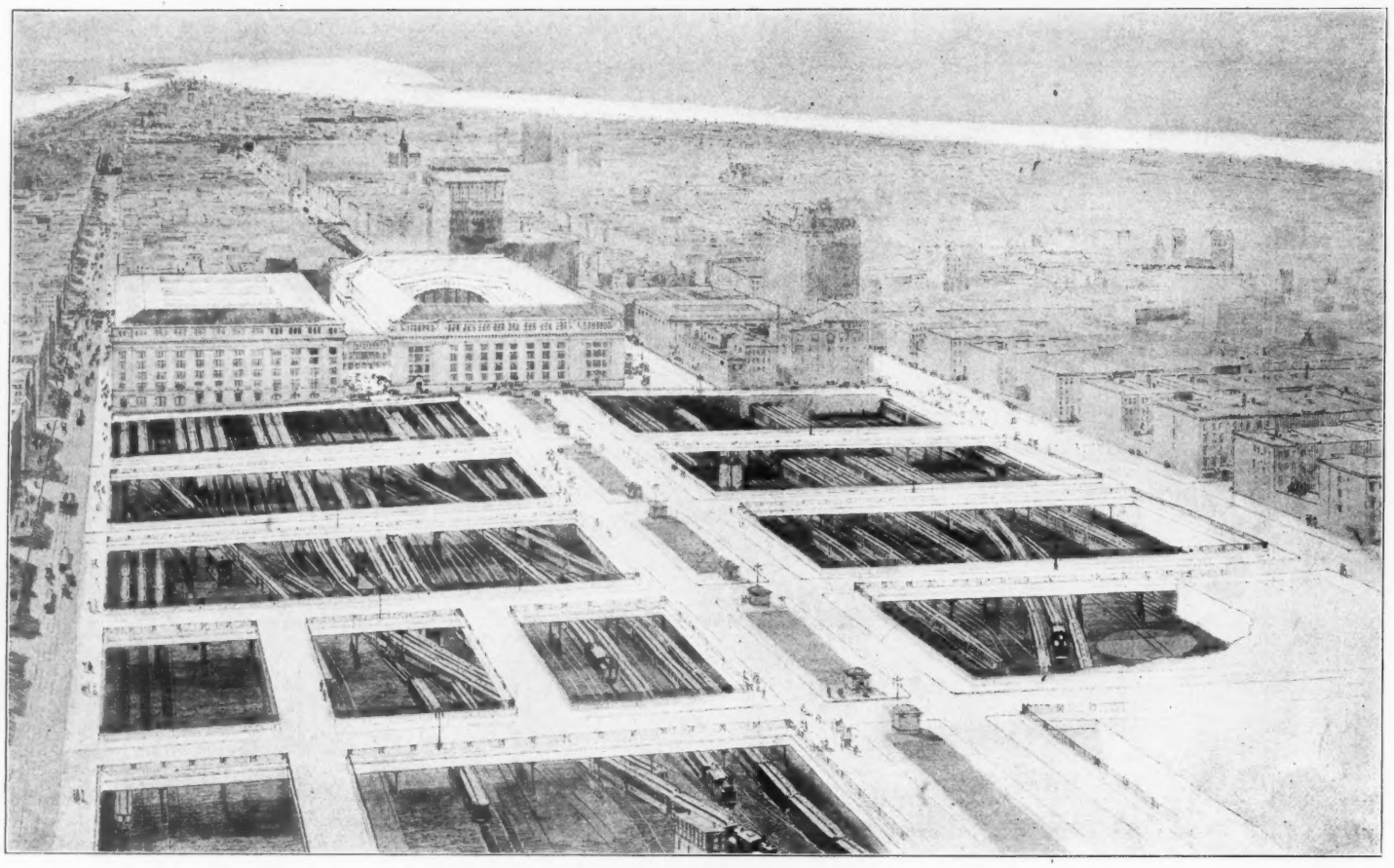
The side and end sheets are No. 11 B. W. G. and the roof sheets are 1/16 in. thick. They are riveted to 2½-in. x 2-in. x ¼-in. angle carlins spaced 24 in. apart. The floor is No. 10 B. W. G. sheets with one thickness of tar paper between sheets at the joints. Each side door is formed of a single No. 14 B. W. G. sheet riveted to light angles. The end doors slide in a Z-bar frame. The car has Sessions "Type C" friction draft gear, Buckeye cast-steel bolsters and Andrews cast-steel truck side frames.

This car differs slightly in dimensions from the Harriman Lines common standard box car. The latter is 40 ft. long inside, 8 ft. 6 in. wide, 8 ft. high, and has a cubic capacity of 2,720 ft. The steel car has the same inside length, but is 8 ft. 10⅛ in. wide, 7 ft. 10 in. high, and the cubic capacity is 2,770 ft. It weighs considerably less than the common standard car, the figure being 37,800 lbs. as against 42,200 lbs. for the latter.

The Grand Central Terminal in 1906 and in 1911.

The accompanying illustrations show the Grand Central terminal at New York in its present transitory state and in the completed form toward which the improvement work is tending. The fundamental idea, involving operating through trains from stub-end tracks at grade, and local trains around a loop below grade, is doubtless familiar to our readers, and has been fully described in these columns. The picture of the completed terminal shown herewith gives a clear idea of the street arrangements, in accordance with which Park avenue will be carried over the center of the yard on an elevated structure connecting directly with the station. This will relieve Madison and Lexington avenues and Forty-second street of much of the vehicle traffic to and from points north of the station, and thus permit, incidentally, of a better surface car service than is now possible on these congested thoroughfares.

Grand Central Yard, Looking South, November, 1906.



General View of Grand Central Yard and Northerly Approaches When Completed in 1911.

GENERAL NEWS SECTION

NOTES.

The Southern Pacific has ordered from the National Tube Works Company enough 8-in. pipe for a 400-mile oil line to be laid in California.

The Presidents of the Chicago, Milwaukee & St. Paul and the Chicago & North-Western have announced their acceptance of the Wisconsin 2½-cent fare.

According to a press despatch the Southern Pacific lines in Texas are to engage hundreds of Japanese to work on track repairs. Considerable numbers are already employed.

Albert H. Stanley, General Manager of the trolley lines of the Public Service Corporation of New Jersey, has been appointed General Manager of the Underground Electric of London.

The Grand Jury in the United States Circuit Court at New York, this week handed up an indictment against the Great Northern Railway Co. for paying rebates to Lowell M. Palmer, the authorized traffic agent of the American Sugar Refining Co.

The Department of Agriculture has handed to the Department of Justice evidence in a large number of cases of violation of the 36-hour law concerning the transportation of live stock. Among the roads named are the Atchison, the Burlington, the St. Paul, the Rock Island, the Big Four, the Southern Pacific, the Union Pacific, the Northern Pacific, the Lake Shore and the Nickel Plate.

The Central Freight Association, after several days' conference, has decided to abolish about 75 per cent. of the commodity rates and put the commodities in the Official Classification. Just what it will be for each commodity will be decided at meetings to be held during the next two weeks by special committees of the Central Freight Association and the Trunk Line Freight Committee at Chicago.

The railroads have succeeded in presenting so strong a case before the Interstate Commerce Commission in the hearings held this week that the Commission will probably modify the rules for the filing and construction of tariffs. Rule 15, which seems to require a railroad to give a competing line the advantage of a local rate in competing with it for through traffic, will probably be withdrawn.

Attorney-General Bonaparte has instituted suits against fifteen railroad companies to recover penalties for violation of the Safety Appliance Law. The roads are the Alabama Great Southern, Atlantic Coast Line, Central of Georgia, Denver & Rio Grande, Eagles Mere, Erie, International & Great Northern, Missouri, Kansas & Texas, Mobile & Ohio (15 cases), Pennsylvania, St. Louis & San Francisco, Southern Pacific, Texas Mexican, and the Wabash.

Receiver Harmon, of the Cincinnati, Hamilton & Dayton, threatens to sue railroads which borrow his freight cars and do not return them in reasonable time. He proposes either to call upon such roads to account to the court, under whose authority he acts, for the profits which they have made on C., H. & D. cars, or else to sue for damages sustained by him in loss of business by reason of lack of cars, whichever course seems likely to bring the most money.

At a recent hearing before the Interstate Commerce Commission in Chicago that body was asked by certain railroads and by the Chicago Board of Trade to issue a general order authorizing the payment of rebates on account of shipments made before the passage of the revised law. As the revision made little or no change in the law, as regards rebates, except to more clearly define it, and to provide for more certain punishment, this request would seem to be very much like asking the commission to formally approve lawbreaking. The request was denied.

The Delaware, Lackawanna & Western, indicted for giving rebates on sugar, under circumstances similar to those of the New York Central cases, in which the road and the shipper were both convicted, has entered a demurrer, on the ground that the shipments from New York to Buffalo were not interstate. Judge Holt, in the United States Court, at New York, February 15, overruled the demurrer, deciding that, as the line of the road passes through other states, the federal law applies. This is in accordance with the decision of the Supreme Court in the case of Hanley vs. Kansas City Southern, January 5, 1903.

According to a press despatch from New Orleans Capt. Charles W. Oldrieve between January 1 and February 10 walked on the water from Cincinnati to New Orleans, a distance of 1,600 miles. The time was 40 days, lacking 45 minutes, and Captain Oldrieve won a bet of $5,000. Oldrieve left Cincinnati January 1 at noon on a wager that he would walk to New Orleans in 40 days. At the falls above Louisville he was delayed for 24 hours, and this was allowed for. He was in motion only during daylight hours, lying over every night. He was equipped with shoes made of cedar wood, 4 ft. 5 in. long, 5 in. broad and 7 in. deep. In a gasolene boat preceding the water walker were Capt. J. W. Weatherington and Arthur Jones. Mrs. Oldrieve was also in the party.

Cornelius A. Jackson, who was the towerman at Ninth avenue and 53d street, New York, in September, 1905, when a Ninth Avenue Elevated train ran off the track at the curve and one car fell to the street, killing twelve persons and injuring twenty-eight, has been convicted of manslaughter in the second degree, before Judge Foster. A strong recommendation for mercy accompanied the verdict of the jury. On the morning of the wreck Jackson had set the signals for a train which was to take the curve. Then he left the tower, and as a Ninth avenue train came along, which should have taken the straight track, it took the curve too fast and the forward car plunged into the street. The motorman, whom most people believed to be responsible, ran away and has not been caught.

The Sixteen-hour Railroad Employee bill was up in the Lower House of Congress on Monday last, but the substitute proposed by the committee was defeated by the opposition of the Democrats, who were able to prevent the bill from receiving the two-thirds vote necessary under suspension of the rules. This action was taken by the Democrats in the belief that the bill as reported by the committee is a "gold brick." They declare that the House bill is full of loopholes purposely placed in it by the Republicans. It is also understood that Senator LaFollette, having become convinced that the House bill is not what it purports to be, urged his friends in the House to vote against it. This failure of the bill will not prevent it from coming up again. If the bill proposed in the House —called the Esch bill—is passed and the question goes to conference, Senator Dolliver will stand out for the LaFollette bill, which is recognized to be anti-railroad, and Mr. Hepburn will contend for the Esch bill, which is regarded as pro-railroad. Senator Dolliver and Representative Hepburn are both from Iowa. It is said that Senator Dolliver will reflect the views of the President in the conference, and if the President says he favors the LaFollette bill instead of the Esch bill, the Senate may win the conference fight; otherwise, without instructions from one House to the other, the bill may die in conference.

New Dry Dock at San Francisco.

According to press despatches from San Francisco, a large dry dock is to be built by the San Francisco Dry Dock Co. at Hunter's Point, adjacent to the two existing docks of the company. The new dock is to be 1,050 ft. long, big enough to hold any two battleships of the United States Navy.

Wheeling and Lake Erie Improvements.

The Wheeling & Lake Erie has just completed, or has nearly completed, the following work:

At Huron, Ohio, one additional slip 1,400 ft. long, 200 ft. wide, 21 ft. depth of water; four Wellman-Seaver-Morgan ore conveyors with five-ton buckets on each; one ore storage bridge, 10-ton bucket, 280 ft. between inner legs with 80-ft. cantilever arms; one McMyler car dumper for unloading coal, and an extensive rope haulage plant for drilling cars from the car dumper to the ore conveyors and ore storage bridge (this ore storage bridge will serve space for storing 1,500,000 tons of ore). An electric light plant is to be put in for lighting the yards, docks, conveyors and car dumpers. The company will increase the terminal tracks by about 3,000 cars capacity. This includes the 2,000-car yard at South Huron, one mile distant from the docks, where all modern improvements for weighing and classifying cars are being put in.

At South Huron yard a coaling plant is being put in for locomotives, also a water station and a roundhouse.

At Cleveland the company is just finishing a new dock along the Cuyahoga river and a new McMyler car dumper with storage tracks of about 1,000 cars capacity. Facilities there are being increased by replacing a number of wooden structures with steel bridges, notably, over Harrison street, Factory street and the Erie Railroad.

Twenty passing sidings are being put in along the road to hold 80 cars each. During the past year 15,000 tons of 90-lb. rails have been laid, and 5,000 additional tons will be laid soon.

The company is now constructing the Sugar Creek & Northern Railroad, a cut-off line between Bolivar, Ohio, and Orrville, 26 miles, by which six miles in distance is saved and the severest grades

of the main line will be eliminated. On the existing line the grades where helper engine service is now necessary, costing about $100,000 yearly, will be done away with, and as business will probably multiply several times within the next few years, the economies in this connection will be proportionately great.

Grading and bridge work on the Sugar Creek & Northern Railroad is about 90 per cent. completed and eight miles of track laid.

At Brewster the company has in contemplation the construction of a 3,000-car yard and extensive shops, roundhouse and other division terminal facilities. The work on the Brewster yard is now under good headway, and the work of constructing the roundhouse will be started in 30 days.

The connection between the Wabash Railroad and the United States steel plants was completed some months ago and is now being used.

The connection between the Wabash Railroad (West Side Belt) at Clairton with the United States Steel Company's works at that point is about finished and is to be put in operation during the next 30 days.

At Clairton, sidings and other facilities are being provided for the interchange of business at that point.

On the West Side Belt in the city of Pittsburg, three of the old wooden trestles are being replaced with steel viaducts, and other improvements, such as reducing the grades, curvature, etc., will be made. This will improve the existing connection with the Pittsburg & Lake Erie, where interchange facilities of considerable magnitude are being provided. This company will use a small portion of the P. & L. E. for reaching its freight terminals on the South Side and the Monongahela river in Pittsburg, where carload consignments will be handled. The present freight station adjoining the Wabash Terminal building in Pittsburg will then be devoted principally to handling smaller consignments.

Electricity for All Harlem Trains.

The electrification of the Harlem division of the New York Central is now so far completed that no passenger trains are drawn by steam locomotives south of Wakefield, thirteen miles from the New York terminal. Ninety-nine through and local trains on that division are now propelled by electric locomotives or run as motor trains in and out of the Forty-second street terminal.

Twelve new local electric trains are put on between New York and Mount Vernon, just beyond the electric terminal yard at Wakefield. These trains arrive and depart from the new Lexington avenue terminal of the Grand Central Station; there are now, including several Croton locals and Yonkers trains, 152 electrically propelled trains, which will arrive and depart from the new terminal.

Complete Block Signaling.

"On the important railroad lines, detailed train rules and written train orders should be things of the past, and all movements of trains, not only when running on tracks designated for their use, but also when running on tracks assigned to trains running in opposite direction, should be controlled and directed by signals; and the rear ends of trains when running slowly or stopped should be protected by fixed signals, instead of train flagmen." The speaker believed that this would be the method of operation in the near future.

This is from a speech of Joseph Crawford at Washington, as reported in the Proceedings of the Railway Signal Association. Mr. Crawford was for years superintendent of the New York division of the Pennsylvania Railroad.

North Shore Railroad of Cuba.

The North Shore Railroad of Cuba has been incorporated under Cuban laws to build 250 miles of railroad. Building is to be begun May 1. C. D. Gibbons, 106 Wall street, New York, is President, and Frank H. Carr, of Grand Rapids, Mich., who was formerly assistant to the General Manager of the Pere Marquette, is General Manager.

Starting at a point of Mayanaba Bay, just north of Nuevitas, Puerto Principe, the line is to run west through the Cubitas valley to Caibarien, in the province of Santa Clara. The road will be about 10 miles from the north coast. A branch is to be built from Senada south to what are claimed to be rich iron mines south of the Cubitas mountains. On the main line south of the mountains are various small towns, of which Moron is the largest.

At present at Caibarien large vessels cannot load sugar within 18 miles of the shore. Freight must be loaded first on scows, and then unloaded, being handled sometimes two or three times. When the new railroad is in operation, the planter will simply have to deliver his sugar to the car. Large docks will be built on Mayanaba Bay and the ships can come alongside so that the sugar may be loaded from the cars to the vessel's hold.

According to President Gibbons, there are from 100,000,000 to 150,000,000 tons of red hematite iron deposits along the route of the line. This iron has no sulphur or phosphorus and assays some 65 per cent. of metallic iron. From 60,000,000 to 80,000,000 tons are owned by Pilling & Crane, of Philadelphia, the Cuba Mining Co., of Bethlehem, Pa., of which John Fritz is President, and the Nova Scotia Iron & Steel Co. The company will develop on its own account some 14,000 acres of iron deposits, which it is estimated will yield from 50,000,000 to 75,000,000 tons of rich ore.

There are said to be no engineering difficulties to be met in the construction of the line. The Cuban authorities have granted a subsidy of $6,000 per kilometer. Among the Cubans interested in the project are Dr. Lincoln de Zayas, Edward L. Delgado and Alfred Betancourt Mandalay, all of Havana.

TRADE CATALOGUES.

Heisler Geared Locomotive.—The Stearns Co., Erie, Pa., has recently issued a catalogue setting forth the advantages of the Heisler geared locomotive. In it, it is claimed that the locomotives of this class possess many advantages over the standard direct-connected machine for industrial works and places where curves are short, grades heavy and track uneven. Singularly enough, this catalogue contains no description of the engine as a whole, but the text is limited to a discussion of the excellence of its details. The illustrations are, however, so numerous and clear that there is no difficulty in grasping the salient features of the machine. It has a boiler of the usual locomotive type and on either side of this, at about the center of the length, there is bolted an inclined cylinder that drives a longitudinal shaft placed centrally beneath the boiler. These two cylinders are set at right angles to each other so that they have the same starting capability as an ordinary locomotive. This longitudinal shaft is cranked and carries beveled pinions that mesh with gears placed upon the axles of the trucks. The trucks are of the four-wheeled bogie type, with wheels coupled by side rods, so that but one gearing on each truck is required. The shaft is fitted with universal joints in which there is ample allowance for the movement of the trucks on curves. As the ratio of the pinions to the gears is not given the ratio of piston to engine speed cannot be ascertained, but it is about one to two. In a table of the sizes and capacities of these engines, the cylinders are of 10-in. diameter and 10-in. stroke for a machine weighing 17 tons; and, for the largest size, or 52 tons, the cylinders are 16¾-in. diameter and 14-in. stroke. The wheels are 30 in. in diameter for the light and 40 in. for the heavy machine, and the minimum curves that they will pass have radii of 50 ft. and 90 ft., respectively. Between these two, six intermediate sizes are listed. The final claim of the 17 that are set forth regarding the excellence of the machine, is to the effect that the engine is not only symmetrical but every detail is up to the standard in workmanship and design of the most modern and best direct-connected locomotive.

Stationary Engines.—Catalogue No. 206 of the American Blower Co., Detroit, Mich., is on the subject, "Vertical Self-Oiling Steam Engines," a special type of which this company lately developed. The details of the engine are all carefully described and illustrated and its merits and advantages set forth. There are two types, "A" and "E," which are covered separately. On the last pages are shown the engines attached to dynamos, pumps, etc. Two small pamphlets accompany the catalogue; they are "A Different Engine," and "Will 100 Per Cent. on Investment Interest You?", both referring to the engines described in the catalogue.

Turbines.—Bulletin No. 2 of the Kerr Turbine Co., Wellsville, N. Y., describes and illustrates the Kerr steam turbine. This turbine is built on the principle of the Pelton water wheel; jets of steam are directed at a tangent into buckets set on the circumference of a diaphragm, the engine consisting of a series of these diaphragms. The buckets are of the double cup type. Steam turbine-driven blowers are also illustrated and described in the bulletin, and tables of dimensions, weights and capacities are given.

Springs.—A new edition of the catalogue of the Railway Steel-Spring Co., New York, shows representative types of the products of that company. The illustrations are half-tone engravings of excellent quality made from wash drawings, and under each is noted briefly the character of the spring and the important features of its construction. The book is printed in red and black on enameled paper and is neat and pleasing in appearance.

Air and Gas Compressors.—Catalogue H36 of the Ingersoll-Rand Co., New York, is devoted to Class H air and gas compressors. These machines are of the duplex, steam-driven type with sub base. Sizes from 10 h.p. to over 200 h.p. are described, and the machines and their parts are shown in 38 excellent half-tones and line drawings. The operation and efficiency of these engines are fully discussed, and tables of dimensions and capacity are given.

Louisville & Nashville.—This company has published a most attractive pamphlet describing the country traversed by its new short line between Cincinnati and Atlanta, which was opened last month.

The illustrations, which are of stretches of the road, bridges and interesting spots near the line, are particularly good.

High-Speed Drills.—The Cleveland Twist Drill Co., Cleveland, Ohio, makers of drills, reamers, bits, etc., has issued catalogue No. 34, showing high-speed steel drills and sockets. Price lists and dimensions of each type are given. The catalogue also gives a page of hints on the use of these drills.

Thermit Welding.—The Goldschmit Thermit Co., New York, is distributing an illustrated folder describing the process of welding rail joints with thermit. The folder gives the weight of the outfit, materials needed, and the number of men in the welding gang and their duties.

Railway Motors.—Bulletin No. 4,474 of the General Electric Co., New York, illustrates and describes the GE-76 railway motor. This motor is rated at 160 h.p. running under 550 volts pressure. Efficiency curves are given of four types of the motor.

Railroad Shops.—Bulletin No. 21 sent out by D. C. Newman Collins, M. Am. Soc. C. E., Consulting Engineer and Architect, New York, is a small pamphlet illustrated with half a dozen sketch plans and half-tones of railroad shops.

Manufacturing and Business.

The Paris & Orleans Railway, France, has specified Falls hollow staybolt iron for the 20 DeGlehn compound locomotives now being built by the Baldwin Locomotive Works.

The St. Louis Frog & Switch Co., St. Louis, Mo., has completed its plant for the manufacture of frogs, switches, switch-stands and special track work for steam and electric railroads. The plant is at 6500 Easton avenue, on the West Belt of the Terminal Railroad, thereby having connection with all St. Louis railroads.

The Mummert, Wolf & Dixon Co., Hanover, Pa., has lately completed a new modern pattern shop; individual motor drive is used. The company has also erected a new machine shop and are equipping it with new machinery to build their "Plurality Die" bolt cutter, and also a revolving oil-stone for sharpening edged tools.

The Danville Car Co., Danville, Ill., has received a large order for equipment from the Illinois Traction System. The contract includes twenty 34-ft. interurban cars, ten 46-ft. interurban cars, 20 express trailers, 12 new cars for the Danville city lines, and six electric locomotives. The contract amounts to about $200,000.

At the annual election of the East St. Louis Locomotive & Machine Shop Company, East St. Louis, Ill., the following directors were chosen: M. M. Stephens, George W. Allen, C. H. Huff, H. D. Cleveland, Thomas M. Gallagher and G. Gallagher. The officers elected are: M. M. Stephens, President; George W. Allen, Vice-President and Treasurer; C. H. Huff, Vice-President and General Manager; H. D. Cleveland, Secretary.

Iron and Steel.

The Bessemer & Lake Erie is reported to have ordered 120,000 steel ties from the Carnegie Steel Company.

The Kansas City, Mexico & Orient has ordered 40,000 tons of rails from the United States Steel Corporation, delivery to begin in March.

The following orders for rails have been given to the Lackawanna Steel Co.: Manila Railway, 10,000 tons; Bolivia Railway, 6,000 tons; Atlantic Coast Line, 10,000 tons, and Lehigh Valley, 2,000 tons.

The Central of New Jersey recently bought a large amount of steel for bridges from the Fort Pitt Bridge Company, of Sharon, Pa., and the Boston Elevated has given an additional order to the same company for a large amount of bridge steel.

The Pennsylvania has ordered 5,000 tons of fabricated steel for bridges from the Pennsylvania Steel Company and the McClintic-Marshall Construction Company. The New York, New Haven & Hartford is reported to be in the market for about 1,800 tons, and the Erie for 2,500 tons of bridge material.

The New York City Railway (Metropolitan) has recently given contracts for 3,000 tons of rails. Other small orders have been let aggregating about 5,000 tons for electric lines. Negotiations are under way for an aggregate of about 47,000 tons of rails for domestic use, and for export to Alaska, the Philippines and to Japan.

OBITUARY NOTICES.

W. A. Howett, formerly local attorney at Chicago for the Illinois Central, died in St. Louis on February 13. Mr. Howett resigned his position with the Illinois Central July 1, 1905, on account of ill health and had been in a sanitarium since that time. He was 46 years old. Before going to Chicago he represented the Illinois Central locally at Hillsboro, Ill., where he practiced law for a number of years. He was appointed local attorney at Chicago for the road, in charge of trial work, in 1897, and held the position until failing health compelled him to give it up.

MEETINGS AND ANNOUNCEMENTS.

(For dates of conventions and regular meetings of railroad conventions and engineering societies, see advertising page 24.)

Canadian Society of Civil Engineers.

At a meeting of this society Feb. 14, two papers were read: "An Investigation on the Value of the Indentation Test for Steel Rails," by H. K. Dutcher, and the "Victoria Bridge, Crossing Bear River, Annapolis and Digby Counties, Nova Scotia," by J. Lorn Allan.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

Colombian Pacific.—E. H. Mason has been elected President and General Manager, with office at Buenaventura, Republic of Colombia, S. A.

Colorado Southern, New Orleans & Pacific.—A. J. Davidson, President of the St. Louis & San Francisco, has been elected also President of the C. S., N. O. & P., succeeding C. C. Cordill. G. A. Clark, General Manager, has been elected Vice-President.

Delaware, Lackawanna & Western.—W. H. Moore, Chairman of the Finance Committee of the Rock Island Company, has been elected a director of the D., L. & W., succeeding Henry Graves, deceased.

Detroit, Toledo & Ironton.—See Mississippi Central.

Illinois, Iowa & Minnesota.—B. H. Harris, Traffic Manager, has been elected also Vice-President.

Mississippi Central.—W. L. Greenhalgh, formerly Assistant Treasurer of the Detroit, Toledo & Ironton, has been appointed Auditor of the Mississippi Central.

Missouri, Kansas & Texas.—C. Haile, Traffic Manager, has been elected Vice-President in charge of traffic, with office at St. Louis, Mo.

Mobile & Ohio.—See New Orleans Terminal.

New Orleans & North Eastern.—See New Orleans Terminal.

New Orleans Terminal.—C. C. Harvey, President of the New Orleans & North Eastern, has been elected also President of the New Orleans Terminal, succeeding L. S. Berg, resigned. A. J. Davidson, President of the St. Louis & San Francisco, has been elected also Vice-President of the New Orleans Terminal. E. L. Russell, Vice-President of the Mobile & Ohio, has been elected also Second Vice-President of the New Orleans Terminal.

New York State Railroad Commission.—George W. Aldridge has been elected Acting Chairman, succeeding Col. G. W. Dunn, resigned.

Rock Island Company.—See Delaware, Lackawanna & Western.

St. Louis & San Francisco.—See Colorado Southern, New Orleans & Pacific; also New Orleans Terminal.

Operating Officers.

Atlantic Coast Line.—Morton Riddle, General Superintendent of the Second division, has been appointed General Superintendent of the Third division, with office at Jacksonville, Fla., succeeding H. A. Ford, assigned to other duties. J. N. Brand, Superintendent of Transportation of the Second division, succeeds Mr. Riddle, with office at Savannah. E. R. Wooten, Superintendent at Richmond, Va., succeeds Mr. Brand. E. Phenneger, Superintendent at Wilmington, N. C., succeeds Mr. Wooten, with office at Richmond, Va. J. C. Murchison succeeds Mr. Phenneger.

Baltimore & Ohio.—L. G. Curtis, Engineer of the Chicago division, has been appointed Assistant Superintendent of that division.

Baltimore & Ohio Southwestern.—See Peoria & Pekin Terminal.

Canadian Pacific.—George Hodge, chief clerk to D. McNicoll, Vice-President, has been appointed Superintendent of Terminals at Montreal.

Chesapeake & Ohio.—The authority of E. P. Goodwin, Superintendent of the Cincinnati division, has been extended over the Kentucky division on account of the ill health of H. C. Boughton.

Chicago & Alton.—W. L. Derr, Superintendent of the Hartford division of the New York, New Haven & Hartford, has been appointed Superintendent of the Chicago & Alton at Bloomington, Ill., succeeding E. Ryder, resigned to go to the Chicago, Indiana & Southern.

International & Great Northern.—E. E. Johnson, agent at Mart, Tex., has been appointed Assistant Superintendent of the Fort Worth division, with office at Mart, succeeding M. H. Trice, promoted.

Mexican Central.—E. E. Styner, General Manager, has resigned.

Missouri, Kansas & Texas.—The office of Trainmaster at Sedalia, Mo., has been abolished, O. F. Fowler having been reappointed chief despatcher at that place.

Missouri Pacific.—J. F. Murphy, Trainmaster at Coffeyville, Kan., has been appointed Superintendent at Wynne, Ark., succeeding H. L. Hungerford, resigned.

New York, New Haven & Hartford.—P. T. Litchfield, chief clerk to the Superintendent of the Plymouth division, has been appointed Assistant Superintendent of that division, with office at Boston, Mass.

See Chicago & Alton.

Peoria & Pekin Terminal.—H. G. Kruse, Trainmaster of the Baltimore & Ohio Southwestern at Washington, Ind., has been appointed Superintendent of the Peoria & Pekin Terminal.

Seaboard Air Line.—T. O. Cole, Car Service Agent, has resigned and the office has been abolished. H. W. Stanley, Superintendent of the Fourth division, has been appointed to the new office of Superintendent of Transportation, with office at Portsmouth, Va. W. A. Witt, Trainmaster at Richmond, Va., succeeds Mr. Stanley, with office at Jacksonville, Fla.

Traffic Officers.

Atlanta & West Point.—J. A. Higgins has been appointed Assistant General Passenger Agent.

Bangor & Aroostook.—Charles Calkins has been appointed General Agent at Stockton Harbor, Me., succeeding G. M. Houghton, promoted.

Canadian Pacific.—J. Halstead has been appointed Assistant General Freight Agent at Calgary, Alb., succeeding H. H. Abbott. W. M. Kirkpatrick has been appointed General Freight Agent at St. John, N. B., succeeding J. N. Sutherland, retired.

Chicago & North-Western.—C. H. Knapp, Assistant General Freight Agent at Chicago, will retire on a pension on March 1. H. C. Cheyney, General Agent at New York, has been appointed Assistant General Freight Agent in charge of local traffic in Wisconsin and Michigan, with office at Chicago. M. J. Golden, traveling agent at Sioux City, Iowa, has been appointed Assistant General Freight Agent in charge of local traffic in Iowa, with office at Chicago. R. M. Johnson, General Agent at Philadelphia, Pa., succeeds Mr. Cheyney at New York. A. L. Armstrong, traveling agent at Cleveland, Ohio, succeeds Mr. Johnson.

National of Mexico.—E. G. Wuerpel has been appointed General Agent at Vera Cruz, succeeding L. R. Gordon, deceased.

Tonopah & Tidewater.—W. M. Jacobsen has been appointed General Agent at Chicago, Ill.

Trinity & Brazos Valley.—D. C. MacWatters, General Passenger Agent, has resigned to go into other business.

Wisconsin & Northern.—Albert Trathen, formerly contracting agent of the Copper Range Railroad, has been appointed General Freight and Passenger Agent of the Wisconsin & Northern, with office at Oshkosh, Wis.

Engineering and Rolling Stock Officers.

Baltimore & Ohio.—See Baltimore & Ohio under Operating Officers.

Bessemer & Lake Erie.—H. H. Harman, Acting Engineer of Bridges, has been appointed Engineer of Bridges, with office at Greenville, Pa.

Erie.—R. B. Watson has been appointed Engineer of Tests, succeeding J. G. Platt, resigned to go to another company.

Georges Creek & Cumberland.—J. Q. Barlow, Chief Engineer of the Western Maryland, has been appointed also Chief Engineer of the Georges Creek & Cumberland.

Louisville & Nashville.—C. Gifford, Master Mechanic at Montgomery, Ala., has been appointed Master Mechanic at Mobile, Ala., succeeding H. M. Minto, resigned. D. D. Briggs succeeds Mr. Gifford.

Pennsylvania Lines West.—H. E. Culbertson, Engineer of Maintenance at Cleveland, Ohio, who has been on leave of absence for several months on account of ill health, has resigned to go into other business.

Western Maryland.—See Georges Creek & Cumberland.

Purchasing Agents.

Norfolk & Southern.—W. R. Burrows, Purchasing Agent, has resigned to go into other business. H. W. Davies, chief traveling auditor of the Atlantic & North Carolina division, succeeds Mr. Burrows.

LOCOMOTIVE BUILDING.

The South & Western is reported to have ordered 120 locomotives.

The Ocean Shore, now under construction, is in the market for locomotives.

The Norfolk & Western is reported to have ordered 25 more locomotives.

The Terminal R. R. Association of St. Louis has recommended the purchase of 12 switching locomotives.

The Fort Worth & Denver City is reported to have ordered two passenger and three switching locomotives.

The Canadian Northern, it is reported, has ordered fifteen 10-wheel locomotives from the Canada Foundry Co.

The Chicago, Burlington & Quincy is reported to have ordered 75 freight and 15 additional passenger locomotives.

The Baton Rouge, Hammond & Eastern, it is reported, will order this month 30 locomotives. Sol Wexler, New Orleans, is Purchasing Agent.

The Shawinigan Falls Terminal, Shawinigan Falls, Que., has ordered one 600-h.p. electric locomotive from the Canadian General Electric Company.

The Seaboard Air Line, it is reported, has ordered 25 locomotives from the American Locomotive Co. and 25 locomotives from the Baldwin Locomotive Works.

The Louisville & Nashville, it is reported, has ordered 20 consolidation and 10 switching locomotives from the Rogers Locomotive Works of the American Locomotive Co.

The Erie, as reported in our issue of February 15, has ordered 35 simple consolidation (2-8-0) type locomotives from the American Locomotive Company for May, June and July, 1907, delivery. Specifications are as follows:

Weight on drivers	183,000 lbs.
Total weight	202,000 "
Diameter of cylinders	22 in.
Stroke of pistons	32 "
Diameter of drivers	62 "
Type of boiler	Straight top
Working steam pressure	200 lbs.
Heating surface, total	3,353 sq. ft.
Tubes—number	380
" material	Charcoal iron
" outside diameter	2 in.
" length	16 ft.
Firebox, length	104 in.
" width	75 "
" material	Steel
Grate area	54.2 sq. ft.
Tank capacity	7,000 gals.
Coal capacity	14 tons

The Des Moines, Iowa Falls & Northern has ordered three simple mogul (2-6-0) locomotives from the Baldwin Locomotive Works, for July delivery. The specifications are as follows:

General Dimensions.

Type of locomotive	Mogul
Weight, total	140,000 lbs.
Weight on drivers	122,000 "
Diameter of drivers	63 in.
Cylinders	19 in. x 26 in.
Type of boiler	Extended wagon top
Boiler, working steam pressure	200 lbs.
" number of tubes	280
" diameter of tubes	2 in.
" length of tubes	11 ft. 6 in.
Firebox, length	96 3-16 "
" width	41⅜ "
" grate area	27 sq. ft.
Heating surface, total	1,815 "
Tank capacity	5,000 gals.
Coal capacity	12 tons

Special Equipment.

Air brakes	Westinghouse
Bell ringer	Gollmar
Couplers	Munton
Injector	Simplex
Piston rod packings	United States
Valve rod packings	United States
Safety valve	Coale
Sanding devices	Leach
Sight-feed lubricators	Nathan Bull's-eye
Springs	Pittsburg Spring & Steel Co.
Steam heat equipment	Gould
Tires—Driving wheel	Midvale
Tires—Truck wheel	Midvale

The Indianapolis Union has ordered three simple six-wheel switching locomotives for April or May delivery from the American Locomotive Company. Specifications as follows:

General Dimensions.

Weight, total	154,000 lbs.
Diameter of drivers	57 in.
Cylinders	21 x 28 in.
Boiler, type	Straight top
" working steam pressure	180 lbs.
" number of tubes	219
" material, tubes	Detroit seamless steel
" diameter, tubes	2 in.
" length, tubes	16 ft.
Firebox, length	72⅛ in.
" width	65¼ "
Grate area	32 sq. ft.
Heating surface, total	2,324 sq. ft.
Tank capacity	5,100 gals.
Coal capacity	7½ tons

Special Equipment.

Air brakes	Westinghouse, American
Bell ringer	Gollmar
Boiler lagging	Keasbey & Mattison
Brake-beams	Damascus
Couplers	Melrose
Headlights	Schroeder
Injector	Ohio
Journal bearings	Streeter
Piston rod packings	United States Metallic
Valve rod packings	United States Metallic
Safety valve	Consolidated
Sanding devices	Leach
Sight-feed lubricators	Chicago
Springs	Pittsburg Spring & Steel Company
Tires—Driving wheel	Midvale

The Illinois Central has ordered 35 simple consolidation, eight simple Pacific and seven simple six-wheel locomotives for August delivery from the American Locomotive Works. Specifications are as follows:

General Dimensions.

	Consolidation.	Pacific.
Types of locomotives	Consolidation.	Pacific.
Weight, total	203,500 lbs.	224,000 lbs.
Weight on drivers	181,000 lbs.	140,500 lbs.
Diameter, drivers	63 in.	75 in.
Cylinders	22 in. x 30 in.	22½ in. x 26 in.
Boiler, type	Radial stayed.	
" wrkg stm pressure.	200 lbs.	210 lbs.
Tubes: number	344	302
" diameter	2 in.	2 in.
" length	15 ft. 6 in.	20 ft.
Firebox, length	107 in.	102 in.
" width	67¼ "	71⅞ "
Grate area	50 sq. ft.	51 sq. ft.
Heating surface, total	2,946 sq. ft.	3,332 sq. ft.
Tank capacity	7,000 gals.	7,000 gals.
Coal capacity	15 tons.	15 tons.

Type of locomotive	Switching
Weight, total	138,500 lbs.
Diameter of drivers	51 in.
Cylinders	19 x 26 in.
Boiler, type	Radial stayed; straight top
Boiler, working steam pressure	200 lbs.
Tubes, number	241
" diameter	2 in.
" length	15 ft. 6 in.
Firebox, length	60 "
Firebox, width	68 "
Grate area	27 sq. ft.
Heating surface, total	1,971 sq. ft.
Tank capacity	4,500 gals.
Coal capacity	6½ tons.

The Great Northern has ordered 10 simple six-wheel switching (0-6-0) locomotives from the Baldwin Locomotive Works in addition to the 140 locomotives reported in the *Railroad Gazette* January 4. The specifications for the switching locomotives are as follows:

General Dimensions.

Type of locomotive	Switching
Weight, total	135,000 lbs.
Diameter of drivers	49 in.
Cylinders	19 in. x 26 in.
Boiler type	Belpaire
" working steam pressure	200 lbs.
" number of tubes	291
" material of tubes	Steel
" diameter of tubes	2 in.
" length of tubes	11 ft. 3 in.
Firebox, length	96 in.
" width	40 in.
" material	Steel
" grate area	27.22 sq. ft.
Heating surface, total	1,873.0 "
Tank capacity	4,000 gals.
Coal capacity	6 tons

Special Equipment.

Bell ringer	Gollmar
Boiler lagging	Magnesia
Brake-beams	Damascus
Couplers	Tower
Headlights	Adams & Westlake
Injector	Ohio
Journal bearings	Great Northern standard
Piston rod packings	Great Northern standard
Valve rod packings	Great Northern standard
Safety valve	Ashton
Sanding devices	Leach
Sight-feed lubricators	Chicago
Springs	Simplex
Steam gages	Ashton
Tires—Driving wheel	Standard
Tires—Truck wheel	Standard

CAR BUILDING.

The Fort Worth & Denver City is reported to have ordered 1,000 box cars.

The Bluff City Lumber Co., Pine Bluff, Ark., is reported to have ordered 10 cars.

C. E. Slade, Orange, Tex., has ordered 15 logging cars from the Orange Iron Works.

The Walworth & Neville Manufacturing Co., Chicago, is figuring on buying 10 box cars.

The Georgia Railway & Electric Co., Atlanta, Ga., is reported to have ordered 16 cars.

The Mississippi Central has ordered 100 box cars from the American Car & Foundry Co.

The Ludington & Northern has ordered one coach from the Hicks Locomotive & Car Works.

The Chicago, Milwaukee & St. Paul will build 3,000 steel cars; it will buy the frames and underframes.

The South & Western is reported to have ordered 5,000 hopper bottom coal cars and 25 passenger coaches.

The Canadian Northern has ordered 20 refrigerator cars of 60,000 lbs. capacity from Rhodes, Curry & Co.

The Philadelphia & Reading has ordered 1,000 box cars of 100,000 lbs. capacity from the Cambria Steel Co.

The United Railways & Electric Co., of Baltimore, has ordered 40 semi-convertible cars from the J. G. Brill Co.

The Western Live Stock Express, Chicago, it is reported, has ordered 100 36-ft. stock cars from the Ryan Car Co.

The New York Central & Hudson River, it is reported, has ordered 50 automobile cars and 20 special horse cars.

The W. E. Caldwell Co., Louisville, Ky., is in the market for 10 or 12 second-hand standard gage flat or logging cars.

The Consolidated Paper & Milling Co., Pittsburg, Pa., has ordered a number of demonstrating cars from the American Car & Foundry Co.

The Boise Valley Construction Co., Boise, Idaho, has ordered two 30-ft. and two 32-ft. semi-convertible electric cars from the American Car Co.

The Temiskaming & Northern Ontario has ordered 100 wooden freight cars from the Rathbun Co. and 100 steel ore cars from the Montreal Construction Co.

The Bolivia Railway has ordered fifty 60,000-lb. flat cars and 20 stock cars from the Middletown Car Works. These cars will have King patent steel underframes.

The Grand Trunk has ordered 500 flat cars of 60,000 lbs. capacity from the Hicks Locomotive & Car Works, and is again reported to be asking prices on 10 passenger coaches.

The Chesterfield & Lancaster, which is now nearly completed, is in the market for rail motor cars for passenger traffic. Charles H. Scott, Cheraw, S. C., is Chief Engineer.

The Spokane & Inland has ordered 250 box cars of 80,000 lbs. capacity from the Seattle Car Company. These cars will measure 40 ft. long, and are for delivery before July 31.

The Long-Bell Lumber Co., Kansas City, Mo., is reported to have ordered 175 steel truck logging cars and six steel tank cars, all of 80,000 lbs. capacity, from the Beaumont Iron Works.

The Interoceanic of Mexico, as reported in our issue of Feb. 1, has ordered one combination first and second class passenger coach and 15 flat cars of 80,000 lbs. capacity from the Mexican Car & Foundry Co.

The Baton Rouge, Hammond & Eastern, it is reported, will place orders this month for 1,000 40-ft. gondola cars, 500 flat cars, 500 box cars and 40 passenger coaches. Sol Wexler, New Orleans, is Purchasing Agent.

The Ocean Shore, now under construction, is in the market for freight equipment, and has ordered some electric passenger coaches. The coaches will be fitted with General Electric Company's electric equipment, Baldwin trucks and Westinghouse air-brakes.

The Charles E. Sholes Company has ordered two tank cars of 80,000 lbs. capacity from the Bettendorf Axle Company for April delivery. These cars will be 25 ft. 7 in. long and 9 ft. wide, over all. The special equipment includes:

Bolsters	Bettendorf
Brake-beams	Damascus
Brake-shoes	Walsh
Brasses	Camel
Couplers	Major
Dust guards	Harrison
Trucks	Bettendorf

The Delaware, Lackawanna & Western, as reported in the *Railroad Gazette* of February 8, has ordered from the Railway Auto Car Company one motor inspection car for August, 1907, delivery. The machinery will be built by the Railway Auto Car Company, and the car body by the American Car & Foundry Company. The car will weigh 70,000 lbs., and will measure 42 ft. long, 10 ft. wide and

13 ft. high, over all. The body and underframe will be of steel. The special equipment includes:

Brakes	Westinghouse high-speed
Couplers	Gould
Draft rigging	Gould
Light	Commercial Acetylene
Trucks	Railway Auto-Car Co.
Vestibules	Open observation vestibule at rear

The Boston & Maine, as reported in our issue of February 8, has ordered 1,000 box cars of 60,000 lbs. capacity from the Pressed Steel Car Company for June, 1907, delivery. These cars will weigh 32,700 lbs., and will measure 36 ft. long, 8 ft. 6 in. wide and 8 ft. high, inside measurements, and 36 ft. 9¼ in. long, over sheathing; 9 ft. 7 in. wide and 12 ft. 6¾ in. high, over eaves. Bodies and underframes will be of wood. The special equipment includes:

Axles	Steel
Bolsters	Pressed Steel
Brake-beams	Buffalo Brake-beam Co.
Brake-shoes	Steel back
Brakes	Westinghouse
Brasses	Magnus Metal Co.
Couplers	Climax
Doors	Sheathing doors
Draft rigging	Miner tandem
Dust guards	Flexible
Journal boxes	Gould
Paint	B. & M. standard freight
Roofs	Murphy
Springs	Railway Steel-Spring Co.
Trucks	Fox pedestal

The Missouri & North Arkansas has ordered four first class passenger, one combination passenger and mail and one baggage car from the Pullman Co., for July delivery. All of these cars will be 60 ft. long and 9 ft. 8 in. wide over sills. The special equipment for all includes:

Axles	Pullman
Bolsters	Commonwealth
Brake-beams	National-Hollow
Brake-shoes	Christie
Brakes	Westinghouse
Brasses	Pullman standard
Couplers	Tower
Curtain fixtures (for first-class and combination cars)	Forsyth
Curtain material (first-class and combination cars)	Pantasote
Door fastenings	Pullman standard
Doors	Pullman standard
Draft rigging	Pullman standard
Dust guards	Pullman standard
Heating system	Safety
Journal boxes	McCord
Light	Pintsch
Paint	Pullman standard
Platforms	Pullman standard
Roofs	Pullman standard
Springs	Union Spring & Mfg. Co.
Trucks	Pullman standard
Vestibules	Pullman standard
Wheels	Pullman standard

RAILROAD STRUCTURES.

El Reno, Okla.—Residents of this place have raised a bonus of $50,000 for the Chicago, Rock Island & Pacific on condition that this place is made the principal Oklahoma division terminal and a roundhouse and shops be put up.

Hazleton, Pa.—The Lehigh Valley will begin work about April 1 on a brick passenger station 32 ft. x 110 ft., to be three stories high.

Hutchinson, Kan.—Plans, it is said, have been made by the Atchison, Topeka & Santa Fe to put up a freight house and warehouse here at a cost of about $40,000.

St. Paul, Minn.—The Minneapolis, St. Paul & Sault Ste. Marie has secured ground in the business section, and is planning to put up a passenger station, also to establish freight terminals.

Scranton, Pa.—The Scranton Railway Company, it is said, will spend $300,000 putting up shops here.

Tampa, Fla.—The Seaboard Air Line, it is said, will spend a large amount of money for improvements in seaport cities of Georgia and Florida. At Tampa it is proposed to build a bridge to connect the main line with Grassy Island, and make that place an export port for Central and South America. At Jacksonville, the company is building a 1,200-car yard, on which track laying is to be started shortly; a machine shop to cost $550,000 is also to be built. At Fernandina, Fla., the government has recently made an appropriation to deepen the channel, and it is said that the Seaboard Air Line has bought 1,400 ft. more wharf front and that this place will be used for coastwise lumber shipments.

RAILROAD CONSTRUCTION.

New Incorporations, Surveys, Etc.

Bloomington Belt Traction.—Incorporated in Illinois with $100,000 capital, and with office at Bloomington, to build a line from that place to Champaign, to form part of the McKinley Syndicate lines. W. B. McKinley, Champaign, Ill.; Peter W. Moore, L. B. Thomas, E. D. Riddle and H. C. Larch, are directors.

Buffalo, Rochester & Pittsburg.—Plans, it is said, are under way to complete the double track from Punxsutawney, Pa., to Rochester, N. Y. The estimated cost of the work is $1,500,000. Last year the company spent a large amount of money laying second track on the main line, and there remain about 11 miles to be done from Brockwayville, Pa., north to Carmen. A branch is also projected from near Juneau, Pa., to Rossiter, to develop new coal mines. Several spurs to mines in South Indiana County are also under consideration.

Canadian Northern Quebec.—An officer writes that this company, which started work last year on extensions from Garneau Junction, Que., to Quebec, 84 miles, has given contracts to O'Brien & Mullarkey, of Montreal, for the work. Grading has been completed from Garneau to St. Casimir, 35 miles. Contracts have also been given to the same company for building from St. Jerome to Montfort, 15 miles; grading completed. No track laid on any of the above.

Central California Traction.—Building from Stockton, Cal., north via Lodi, Galt and Elk Grove to Sacramento, 50 miles. Contracts let to Moring Bros., of Stockton, to build from Stockton to Lodi, 16 miles. Four miles of track laid. An extension is projected from Stockton southeast to Modesto, an additional 45 miles. R. S. Masson, Stockton, is Chief Engineer.

Delaware & Hudson.—The Northern Coal & Iron Company, which is controlled by the Delaware & Hudson, has secured considerable land in Plymouth Township to be used in the construction of its new line to a connection with the Pennsylvania. The line is to be built via Plymouth Junction, Larksville, Edwardsville, Dorranceton, Port Blanchard and Sebastopol connecting with the main line of the D. & H. near Smithville.

Denver City Tramway.—This company proposes to issue stock to secure funds to lay 70 miles of track to extend and improve two viaducts and to build new shops and car barns. David H. Moffat, President of the Denver, North-Western & Pacific, and William G. Evans are interested.

El Dorado & Wesson.—This company is building from El Dorado, Ark., to Wesson, 10 miles. Contracts have been let to A. J. Seymour for seven miles, and to James Ulmer for three miles. Grading has been completed for seven miles, and track laying is to be started in March. James Harrington, Chief Engineer, El Dorado, Ark.

Erie.—This company has incorporated the Erie Terminal Railroad to carry out some of the improvements now under way on the New York division.

The Erie is reported to be back of the Elmira, Corning & Waverly, an electric line, which is building from Waverly, N. Y., to Elmira, on the right of way of the Erie, and to be negotiating with G. T. Rogers, of Binghamton, N. Y., who recently secured the Waverly, Sayre & Athens Traction Company to buy that line and extend it to Binghamton. This would give the Erie an electric system from Corning to Waverly and Binghamton.

Erie Terminal.—See Erie.

Grand Rapids Terminal Belt.—An officer writes that this company, which was incorporated last year to build a belt line around the city of Grand Rapids, Mich., will begin grading work this spring. The line has been located from the Lake Shore & Michigan Southern to the Michigan Central, 3⅓ miles. E. H. Christ, Chief Engineer, Grand Rapids, Mich.

Great Northern.—An officer of the Vancouver, Victoria & Eastern, under construction from Midway, B. C., west via Molson and Oroville, Wash., and Keremeos and Hedley, B. C., to Princeton, B. C., writes that grading has been completed from Midway to Keremeos, 96 miles, and track laid from Midway to Oroville, Wash., 56 miles, also from Oroville to the crossing of the Semilkameen river, eight miles. Contracts are soon to be let for extending the line from Keremeos to Princeton, 45 miles.

Green Bay, Oshkosh, Madison & South-Western.—See Wisconsin & Northern.

Ithaca & Seneca Falls Interurban.—Incorporated in New York with $1,000,000 capital to build from Ithaca, N. Y., north to Seneca Falls, with branches from Willard to Ovid, and from Trumansburg to Mecklenburg, a total of 52½ miles. J. N. Hammond and T. J. Cary, Seneca Falls, and J. Rothschild, Ithaca, are Directors.

Kansas City Southern.—To secure easier grades and curves this company is planning to build a cut-off from Siloam Springs, Ark., along the Arkansas-Indian Territory boundary line, south to Cherokee Junction, Ind. T., thence paralleling the St. Louis, Iron Mountain & Southern to Fort Smith, and south through Sebastian and Scott Counties, joining the old main line near Mena, Ark., in all about 120 miles.

Missouri Pacific.—This company is now laying, on the St. Louis, Iron Mountain & Southern, second track from McAlmont, Ark., to Little Rock, seven miles. About 15,000 cu. yds. of fill remains to be placed. Five miles of track laid.

Napa & Vaca Valley.—Incorporated in California to build a line from Vallejo, Cal., via Napa Junction, Soscol and Cordelia to

Vacaville, 30 miles. E. H. Winship, H. M. Meacham and D. A. Dunlap, of Napa, are interested.

NEW JERSEY SHORT LINE (ELECTRIC).—An officer writes that this company, which is building from Milltown, N. J., to Elizabeth, 19 miles, has given contracts to the Schuylkill Stone Company, of Philadelphia, Pa., for building from Metuchen to Elizabeth, 10 miles Grading completed for about 50 per cent. of the way, but no track laid. Additional contracts are shortly to be let. Richard I. D. Ashbridge, Weagel Building, New Brunswick, N. J., Chief Engineer.

NEW YORK CONNECTING.—See Pennsylvania.

NEW YORK NORTHERN (ELECTRIC).—Organized in Watertown, N. Y., to build from that place south to Oswego, about 70 miles, where connection is to be made with the New York, Ontario & Western and the Delaware, Lackawanna & Western. F. P. Shines is President.

OREGON EASTERN.—See Southern Pacific.

OREGON ELECTRIC.—An officer writes that contracts have been given to W. S. Barstow & Co., of New York and Portland, for building this proposed line from Portland, Ore., to Salem, 50 miles. Eight miles already built. The work includes a bridge over the Willamette river, 800 ft. long.

OREGON SHORT LINE.—This company is reported to be planning a 30-mile extension from Kemmerer, Wyo., north to coal fields.

PENNSYLVANIA.—The Board of Estimate and Apportionment of New York City has approved the application of the New York Connecting Railroad for a franchise. This is to permit the joining of the Pennsylvania and New York, New Haven & Hartford by a line running from the Long Island Railroad terminal yards in Long Island City to the Harlem River Terminal by way of bridges to be built over the East river and Ward's and Randall's islands. For nearly two years the Board of Estimate refused to approve the franchise on the ground that the conditions made by the Rapid Transit Commission were not sufficiently favorable to the city. The amended terms differ only slightly from those originally fixed by the commission. After approving this franchise, the Board granted the application of the company to lay out the Sunnyside freight yards in Long Island City, and authorized the closing of 52 streets within the property purchased by the company for this freight terminal. Contracts will shortly be let, and the work pushed to completion as soon as the legal formalities have been finished. (See *Railroad Gazette*, December 28, 1906; page 570.)

PITTSBURG, SUMMERVILLE & CLARION.—The Millcreek branch is being extended from Millcreek, Pa., for 10 miles by the A. Cook's Sons Company, to connect with its lumber properties. Three miles have been built.

QUEBEC & JAMES BAY.—See Quebec & Lake St. John.

QUEBEC & LAKE ST. JOHN.—This company, which is building a branch from La Tuque Junction, Que., to La Tuque Falls, 40 miles, has completed grading on 35 miles, and has track laid for 30 miles. Joseph Paquet, of Levis, Que., is the contractor.

Contracts have been given to Edward Conway, of Quebec, for building the Gosford branch, from Valcartier Station, Que., to Riviere aux Pius, six miles. Track laid for five miles.

Under the name of the Quebec & James Bay surveys have been made for a line from Roberval, Que., to Chute a L'Ours, 30 miles.

ST. LOUIS & OKLAHOMA SOUTHERN.—Incorporated in Missouri with $200,000 capital and office at Pineville, to build from Pineville, McDonald County, Mo., to a point in the southeastern corner of that county, about 20 miles. I. E. Sturges, J. N. Christensen, O. St. John, A. W. Noel and C. D. Dennett, of Pineville, are interested.

ST. LOUIS, BARTLESVILLE & PACIFIC.—Incorporated in Oklahoma with $7,200,000 capital and office at Ponca City, to build from Joplin, Mo., west across the Indian Territory and Oklahoma to Pond Creek, Okla., about 240 miles. The incorporators are: G. B. Keller, J. L. Overlees, F. M. Overlees, J. J. Curl and H. J. Holm, of Bartlesville; M. Cunyon and W. L. Barnum, of Ponca City; C. Steckler and J. W. Bird, of Pond Creek.

SAN JUAN DE OAXACA.—An officer writes that this company, which is building from San Pablo Zimatlan, state of Oaxaca, Mex., to Taviche, about 17 miles, has completed all of the line except about two miles. The work includes two large bridges. Houston & Buckner, Oaxaca, contractors. William Waters, Ocotlan, Chief Engineer.

SHREVEPORT NORTHEASTERN.—An officer writes that this company is building a line from Shreveport, La., northeast via Minden and Homer, La., and Eldorado, Ark., to Memphis, Tenn., 285 miles. Contracts let to the Northeastern Construction Company, of Homer and Shreveport, to build from Shreveport to Eldorado, 85 miles. Grading completed for 25 miles, and track laid for five miles. A. K. Clingman, Shreveport, La., President, and J. T. Hardeman, Minden, La., Chief Engineer.

SOUTHERN PACIFIC.—According to local reports, final plans for building the Oregon Eastern have been made. The survey runs east from Natron, Ore., up to the middle fork of the Willamette to Salt Creek, up that stream through the cascades via Odell Pass through Christmas Lake Valley, thence down the Malheur river to Ontario, about 320 miles.

STEPHENSVILLE, NORTH & SOUTH TEXAS.—Incorporated in Texas with $250,000 capital, and office at Stephensville, to build from Stephensville, in Erath County, south to Hamilton, in Hamilton County, about 35 miles. The incorporators include B. C. Cage, Marshall Ferguson and W. S. Watson, of Stephensville, and John Spurlin of Hamilton.

TEMISKAMING & NORTHERN ONTARIO.—Contracts have been let to McRae, Chandler & McNeil, of Quebec, at about $1,000,000 for extending this road to a junction with the Grand Trunk Pacific at a point about 112 miles north of Englehart. Track has been laid to McDougall's Chute, 54 miles north of Englehart, and the work called for in the contract is for about 58 miles. Contracts for 65,000 rails have been given to the Algoma Steel Company, of Sault Ste. Marie.

TEXAS ROADS.—In addition to the order recently issued by the Railroad Commission requiring the railroads to build a causeway across Galveston Bay, the Gulf, Colorado & Santa Fe, the Galveston, Harrisburg & San Antonio, the Galveston, Houston & Henderson, the Missouri, Kansas & Texas, the Great Northern, and the Galveston Wharf Company have been directed to increase their side tracks and spurs at least 25 per cent., and all these companies with the exception of the Galveston Wharf Company to increase the present platform facilities at Galveston 25 per cent., the work to be completed by August of this year. These improvements are to be made to expedite the handling of freight at Galveston, where present facilities are inadequate.

VANCOUVER, VICTORIA & EASTERN.—See Great Northern.

WABASH.—This company has opened its new connecting line to the Clairton, Pa., plant of the Carnegie Steel Co. This gives the Wabash access to the mills in the district along the Monongahela river above McKeesport, which it has been trying to secure for several years. Traffic arrangements have been made with the Pittsburg & Lake Erie by which the use of that company's spur tracks to various manufacturing works has been secured.

WESTERN PACIFIC.—This company has let contracts to the Utah Construction Company, of Ogden, Utah, for 110 miles in Utah, 107 miles in Nevada and 174 miles in California, and to E. B. & A. L. Stone, for 185 miles in California. Grading completed and 94 miles of track laid in Utah. Contracts are to be let in February for the remaining 326 miles in Nevada. In California 130 miles of grading are completed and 10 miles of track laid. There are now about 5,000 men at work at various points on the line. The work includes 48 tunnels aggregating 48,263 lineal feet.

WISCONSIN & NORTHERN.—An officer writes that this company, which is the successor of the Green Bay, Oshkosh, Madison & South-Western, is building from Menasha, Wis., via Appleton, Shawano, Gresham, Langlade and Crandon to a connection with the Minneapolis, St. Paul & Sault Ste. Marie in North Crandon, 125 miles. Contracts have been let to McDonnell, O'Connor & Co., of Shawano, for building from Gresham to Langlade, 25½ miles. The company has already built from Shawano to Neopit, 21 miles, and from Crandon to a connection with the Minneapolis, St. Paul & Sault Ste. Marie, seven miles. Grading has been completed from Gresham to Neopit, 11 miles, on the above contract; additional contracts are soon to be let. William Cambier, Oshkosh, Wis., is Chief Engineer.

WOLF, MEGANTIC & LOTBINIERE.—An officer writes that this company, chartered to build from Lime Ridge, Wolf County, Quebec, north to Quebec, about 100 miles, has secured the right of way. The Quebec Government has granted subsidies of 2,000 acres per mile for 60 miles, and the Dominion Government $3,200 per mile, not exceeding 50 miles. Negotiations are pending with the Lotbiniere & Megantic to build the line. W. H. Lamby, Inverness, Que., Secretary.

RAILROAD CORPORATION NEWS.

ALABAMA GREAT SOUTHERN.—See Birmingham Terminal Co.

BIRMINGHAM TERMINAL COMPANY.—This company has sold $1,500,000 4 per cent. bonds, being part of an authorized issue of $3,000,000; of the unissued remainder $500,000 is reserved for terminal improvements and is not to be issued until January 1, 1908, and $1,000,000 is reserved for additions, betterments and acquisitions, and is not to be issued until January 1, 1909, and then only with the consent of the following companies, which own the entire capital stock and guarantee the bonds; Illinois Central, Southern, Seaboard Air Line, St. Louis & San Francisco, Central of Georgia and Alabama Great Southern. These six companies agree to use the station now being built by the Birmingham Terminal Company at Birmingham, Ala., during the life of the bonds.

CENTRAL NEW ENGLAND.—A committee for the protection of the minority holders of the common stock, preferred stock and general mortgage 5 per cent. income bonds of this company has been formed. It consists of T. C. Delavan, Charles Gregory and George F. Cummings. The object of the committee is to have the management pay interest on the bonds or else buy the bonds and stock at a price considerably above the present market value. The stock is held by a voting trust for 10 years from January, 1899, or until 4 per cent. interest is paid on the general mortgage bonds for two years. Since their issue in 1899, no interest has been paid on these bonds, which are junior to the $1,250,000 first mortgage 5 per cent. bonds. The New York, New Haven & Hartford acquired in February, 1904, $5,904,000 of the $7,250,000 general mortgage bonds, $2,963,300 of the $3,450,000 common stock and $2,696,100 of the $3,150,000 preferred stock. The Central New England operates 256 miles of road, including the Poughkeepie Bridge, which it owns.

CENTRAL OF GEORGIA.—See Birmingham Terminal Co.

COLORADO & SOUTHERN.—An initial dividend of 2 per cent. on the $8,500,000 4 per cent. non-cumulative second preferred stock has been declared payable April 1 to holders of record on March 16.

DELAWARE, LACKAWANNA & WESTERN.—The annual report for the year ended December 31, 1906, issued February 19, shows gross earnings of $32,962,880, an increase of $1,011,817; net earnings $12,490,438, a decrease of $632,565. Freight earnings increased 12 per cent. and passenger earnings 13 per cent., while coal earnings decreased 8 per cent. Other income increased $560,000, but renewals and betterments, which are included in charges, increased $1,960,000; the surplus after dividends was $587,072, as compared with $2,698,428 at the end of the previous year.

DETROIT, JACKSON & CHICAGO (ELECTRIC).—See Detroit United.

DETROIT UNITED (ELECTRIC).—The Detroit, Jackson & Chicago, a holding company which recently took over the Detroit, Ypsilanti & Ann Arbor for the Detroit United, has made a mortgage for $4,000,000 to the Security Trust Company, Detroit, securing that amount of 5 per cent. bonds; of this amount, $595,000 are reserved for improvements and extensions, and the remainder is to go to holders of the D. Y. & A. A. securities as follows: $1,610,000 to retire outstanding bonds, $990,000 to retire the remaining bonds authorized, and $805,000 to be paid to stockholders. It is said that the D. Y. & A. A. will be completed from Jackson, Mich., to Chicago, about 200 miles.

ILLINOIS CENTRAL.—Gross earnings for the six months ended December 31, 1906, were $27,959,998, an increase of $2,640,776; net earnings $8,030,387, an increase of $404,220.

See Birmingham Terminal Co.

INTERBOROUGH RAPID TRANSIT.—W. A. Read & Co., New York, and Lee Higginson & Co., Boston, have bought $10,000,000 three-year 5 per cent. notes dated March 1, 1907, and subject to call at 101 and interest on and after March 1, 1909. The proceeds, it is said, will be used to pay off the entire floating debt of the company, to pay for the extension of the subway under the East river to Brooklyn, and to pay for securities of the New York & Queens County, the Long Island Electric and the New York & Long Island Traction. The Interborough Rapid Transit already has outstanding $15,000,000 three-year notes due May 1, 1908.

MANILA ELECTRIC RAILROAD & LIGHTING.—See Manila Suburban Railways Company.

MANILA SUBURBAN RAILWAYS COMPANY.—This company has sold $500,000 5 per cent. first mortgage 40-year sinking fund bonds, being part of an authorized issue of $2,500,000, guaranteed principal and interest by the Manila Electric Railroad & Lighting Corporation. The Manila Suburban Railways Company has been organized to build and operate lines connecting with the lines of the Manila Electric Railroad & Lighting, which controls the street railways, light and power system of Manila.

MISSOURI & KANSAS INTERURBAN.—Swartwout & Appenzellar, New York, are offering for sale $500,000 first mortgage 5 per cent. 50-year bonds dated January 1, 1906. The St. Louis Union Trust Company is trustee and the interest for the first two years is guaranteed by a cash deposit. The road is 20 miles long, running from Kansas City, Mo., to Olathe. It is equipped with three Strang gasolene-electric motor cars, one steam locomotive and six other cars. It has $1,000,000 capital stock and the authorized bond issue is $600,000. The $500,000 bonds were sold to pay for the construction and equipment of the road, and the remaining $100,000 is reserved for additional terminals, equipment and other uses.

MISSOURI RIVER & NORTHWESTERN.—This property has been put in the hands of a receiver. The company owns 35 miles of road from Rapid City, S. Dak., to Mystic, and has $1,000,000 capital stock and $700,000 outstanding bonds. It was opened in March, 1906.

NEW YORK, NEW HAVEN & HARTFORD.—This company has sold to Kuhn, Loeb & Co. $29,000,000 4 per cent. 15-year debentures. They will be placed in France, Germany and Holland through a syndicate of foreign bankers.

This company has bought through Kidder, Peabody & Co., Boston, a majority of the $1,500,000 stock of the Boston & Philadelphia Steamship Co., which operates seven steamers between Boston, Providence, Fall River and Philadelphia.

See Central New England.

NORTHERN PACIFIC.—Estimated gross earnings for the month of January, 1907, were $4,139,559, a decrease of $416,555; freight earnings decreased $692,846, or 20 per cent., while passenger earnings increased $272,665, or 33 per cent.

PENNSYLVANIA.—This company has sold to Kuhn, Loeb & Co. $60,000,000 three-year 5 per cent. notes. Of this amount, $50,000,000 are to retire the $50,000,000 Pennsylvania Company 4½ per cent. 18-month notes maturing November 1, 1907. The official announcement says that "the proceeds will meet all the requirements of the company this year for construction, expenditures and otherwise, including the New York terminal. It will not be necessary to use this year any of the stock of the company or any of its bonds which the stockholders have, as a wise precaution, been asked to authorize at the annual meeting to be held on March 12 next." The notes are secured by car trust notes, water bonds and other collateral.

See Philadelphia & Erie.

PHILADELPHIA & ERIE.—The stockholders at the annual meeting approved the agreement by which the common stock not already owned by the Pennsylvania may be exchanged for Pennsylvania stock. It was announced at the meeting that the Pennsylvania would not pay cash for any shares not exchanged. (Jan. 25, p. 130.)

PHILADELPHIA & READING.—Gross earnings for the six months ended December 31, 1906, were $21,042,118, an increase of $219,214; net earnings $8,187,380, a decrease of $696,644.

PONTIAC, OXFORD & NORTHERN.—The Supreme Court has given a verdict for $186,000 in favor of this company in its suit against Hugh Porter, who was President of the road before it went into the hands of a receiver in March, 1905. Evidence was produced showing that President Porter had drawn the above amount from the company's funds, and had used it for purposes not connected with the company. The road runs from Pontiac, Mich., north to Caseville, on Saginaw Bay, 100 miles.

ST. LOUIS & SAN FRANCISCO.—The First National Bank of Chicago is offering the unsold part of $3,300,000 5 per cent. car trust notes maturing in semi-annual installments from July 1, 1907, to January 1, 1917. These notes are secured on 3,300 freight cars costing $3,732,000, and are guaranteed principal and interest by the American Car & Foundry Company, which built the cars.

See Birmingham Terminal Co.

SEABOARD AIR LINE.—It is reported that this company is back of the North Carolina Terminal Company, which was recently incorporated and which has bought wharf property at Wilmington, N. C., including water frontage of something more than 290 ft. It is said that the Seaboard Air Line will establish a coaling station at that point.

See Birmingham Terminal Co.

SOUTHERN.—The New York Stock Exchange has listed $250,000 St. Louis division first mortgage 4 per cent. bonds of 1951, making $12,500,000 outstanding; $800,000 Memphis division first mortgage 5 per cent. bonds of 1996, making $6,583,000 outstanding, and $1,351,000 first consolidated mortgage 5 per cent. bonds of 1994, making $48,137,000 outstanding. The proceeds of the sale of the additional St. Louis division bonds were used mostly for the Jasper-French Lick extension; the new Memphis division bonds were issued to partially pay for the building of the line from Savannah to Chattanooga, Tenn.; of the new first consolidated bonds, $778,000 were for yards, stations, side tracks, equipment and water stations, and the remainder for the redemption of the bonds of subsidiary companies.

See Birmingham Terminal Co.

TIDEWATER.—The Tidewater Construction Company has been organized to complete this road and has sold $10,000,000 6 per cent. two-year notes to the Central Trust Company. The notes are endorsed by H. H. Rogers and secured on $20,000,000 authorized but unissued Tidewater Railway bonds and $10,000,000 other securities. The proceeds, it is said, are to pay for the completion of the road.